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ABSTRACT

The purpose of the analysis was to provide a profile of instructional activities related to content and referenced to specified instructional outcome areas. Emphasis was placed on determination of four major factors: (1) major outcomes in the program and their relative emphasis in both regular and supplementary instructional materials, (2) the distribution of content within and across instructional units (chapters), (3) points in the instructional sequence where mastery of outcomes is assessed, and (4) the amount of independent practice in regular and supplementary instructional materials related directly to each major outcome developed in the program. The content analysis was organized by 13 content strands and is presented in a series of tables. Table entries indicate the grade level and page location at which each topic is discussed. Locations of diagnostic tests are also indicated. The completed analysis forms the basis for preliminary specification of an application of Learning Mastery System procedures to the series. (Author/SD)

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NO: TN 3-72-32

TITLE: CONTENT ANALYSIS OF HEATH MATHEMATICS PROGRAM FOR ELEMENTARY GRADES K-6

AUTHORS: Elijah Babikian, Jim Winchester and Aaron Buchanan

ABSTRACT

A content analysis was completed of the D.C. Heath mathematics series for elementary grades. The purpose of the analysis was to provide a profile of instructional activities related to content and referenced to specified instructional outcome areas. Emphasis was placed on determination of:

1. major outcomes in the program and their relative emphasis in both regular and supplementary instructional materials.
2. the distribution of content within and across instructional units (chapters).
3. points in the instructional sequence where mastery of outcomes is assessed.
4. the amount of independent practice in regular and supplementary instructional materials related directly to each major outcome developed in the program.

The completed analysis forms the basis for preliminary specification of an application of Learning Mastery System procedures to the series.

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CONTENT ANALYSIS OF HEATH MATHEMATICS PROGRAM FOR ELEMENTARY GRADES K-6

Elijah Babikian, Jim Winchester and Aaron Buchanan

This document describes a content analysis of the Heath mathematics series for elementary grades. The document is divided into three sections as follows:

Description of the Analysis. Procedures used by staff members of the Southwest Regional Laboratory for Educational Research and Development (SWRL) in performing the analysis are described. These procedures were used to generate descriptors of instructional outcomes from index entries in the Heath teacher's editions and to determine the location of instructional and evaluation activities relevant to these outcomes in various Heath components.

Interpretation of the Analysis. Procedures are recommended for identifying relationships in the analysis table between content organization, evaluation of outcomes, and provisions for individual practice, and for comparing these relationships with those desired in an application of a Learning Mastery System.

Preliminary Specifications of a Learning Mastery System Application. Broad preliminary specifications for the architecture of an application of a Learning Mastery System to the Heath series are presented. These specifications include: (1) a discrete number of broad instructional outcomes that can serve as a unifying structure for assessing pupil progress through various levels of the program, (2) suggested evaluation components, and (3) materials suitable for individual practice on

outcomes assessed in LMS throughout the program.

DESCRIPTION OF THE ANALYSIS

CONTENT STRANDS

The analysis is organized around twelve vertical strands of content identified by Heath as basic units of a program structure. These strands are listed below in the order of their appearance in the program scope and sequence chart in each teacher's edition.

Structure
Sets
Numeration[1]
Number[1]
Number sentences
Addition and subtraction
Multiplication and division
Geometry
Measurement
Functions[1]
Problem solving and applications
Probability and statistics
Number theory

OUTCOME DESCRIPTORS

For each strand and substrand, a set of outcome descriptors has been prepared by SWRL staff to describe the content at each level of the program. These descriptors are statements of expected outcomes of instruction. A set of descriptors from the "Number and Numeration" strand in Level 5 is shown below.

1. Read and write numerals

   To thousands
   To hundred thousands

[1] In levels 5 and 6 "Numeration" and "Number" are combined into one strand, and "Functions" is introduced.

To millions
To billions

2. State the place-value of a digit

In whole numbers
In decimal fractions

3. Represent numerals in different forms

Expanded form
Standard form
Exponential form

4. Recognize fractional numbers in common form

Equivalent fractions
Improper fractions
Mixed numerals

5. Relate fractional numbers in common form to

Whole numbers
Mixed numerals
Fractional numbers in decimal form

Outcome descriptors were derived using the following procedures:

1. All entries in the index of the teacher's edition were partitioned according to content strands listed in the scope and sequence chart. Since scope and sequence entries overlapped somewhat between strands, elementary priorities in classification were followed which eliminated most of the multiple listing of index entries.

2. Within each strand, index entries were translated into a small set of statements of intended mathematical behaviors (outcome descriptors). In some instances, the descriptors are comprehensive, and no subordinate outcomes are included; in other instances, subordinate outcomes are included because major portions of the instructional materials were devoted to their review.

TABLE ENTRIES

Instructional activities (designated lessons) from the core components of the Heath program were classified according to the prespecified outcome descriptors. Since the purpose of the analysis was to obtain a profile of instructional activities, an exhaustive listing of all activities included in all components was not necessary. The components used were the student text (teacher's edition), the basic worksheets and a separate battery of diagnostic tests. Supplementary worksheets were not included because they do not present the basic concepts and skills in the same setting as the textbook, and they are not intended for remediation. A description of all supplementary program components is in Appendix A.

Entries in the table are page numbers in the student text, workbook, and diagnostic test batteries where instructional activities pertinent to the outcome descriptor are located. For each entry, the number of items or problems directly related to the outcome descriptor was determined. It was reasoned that item frequencies directly related to an outcome descriptor are better indicators of the amount of independent practice provided in a chapter for each outcome than are page entries. In determining item frequencies, the number ten was chosen as a cutoff point since most instructional activities related principally to major outcomes contained at least ten items of practice. An entry of (10) following a set of page entries indicated that ten or more items providing direct practice on the outcome were found in the chapter.

During the course of the analysis, it became necessary to develop conventions for determining item frequencies. Items were counted according to the number of separate responses requiring direct outcome-related performances. In some instances, such as the reproduction of counting sequences, individual responses were not independent of each other. In this case, each separate sequence was counted as a response. In many instances, mastery of a particular outcome, such as recognition of commutativity of addition, would be helpful in making a response, but unnecessary. Where responses could be made as a result of acquisition of some other outcome, especially an outcome that is learned rather early in the instructional sequence (such as recognition of number facts), no items were recorded with the descriptor. Conventions were also developed for classifying problems in activities involving either number line or semi-concrete pictorial models to solve equations. While use of the model might be helpful in making a required response, it was seldom required that the model be interpreted; a recall of basic number facts or the application of some computation algorism was usually sufficient. In instances such as these, an item was recorded for purposes of the analysis with a descriptor involving "models" if there were separate representations of the model for each equation.

Actual entries for a particular descriptor are coded as follows:

1. Pages from the student text (or student pages from the teacher's edition) appear in regular typeface with the number of items, to 10, following in parentheses.

2. Pages from the student workbook and the number of related

items, to 10, are underlined.

3. Diagnostic test entries are preceded by DT with the number of the test and the number of items related to the descriptor following.

INTERPRETATION OF THE ANALYSIS

CONTENT STRANDS

The distribution of content in the program can be inferred from the analysis in the following ways:

1. Examination of Instruction and Evaluation Entries for a Particular Outcome Across Chapters and Levels. It is possible to draw some conclusions concerning the independence of one outcome from another. If there are several instructional entries, but few review or evaluation entries, it is possible to infer that this outcome cannot be easily separated from other outcomes during instruction. This inference is related to methods used in development of the analysis. The major source of instruction entries (textbook) was the index of teacher's editions at each level. Since index entries are likely to be classified with as many content domains as are possibly relevant, there was some multiple classification among instructional entries. Review and evaluation entries, on the other hand, were made from a page-by-page analysis of the components. In this case, multiple classification was avoided wherever possible, and activities were referenced to the outcome with the most appropriate descriptor.

2. Examination of Entries in the Chapter Columns. For purposes of a Learning Mastery System, it is desirable that content included in

each chapter be reasonably homogeneous. Unit division should be determined primarily by outcomes to be acquired and their presentation sequence. The instructional entries in each chapter should be spread over no more than 7 or 8 outcomes if evaluation of mastery is to retain some reliability and tests are to remain a reasonable length. Where chapters in Heath provide instruction on more outcomes than this, it may be necessary to defer assessment of some outcomes until they are represented in a subsequent chapter.

3. Examination of all Descriptors for a Particular Content Strand over all Levels of the Program. If there are very few descriptors that differ distinctly, or if the set of descriptors show little hierarchical relationship, the strand probably does not possess strong sequential characteristics of its own. Frequently, as in "Problem Solving and Application", the strand exists primarily for the inclusion of activities where mathematical skills are applied to verbal or pictorial problems. Some strands, such as "Sets" in Levels K-3, exist principally as a model for whole numbers and related operations. By comparison, material devoted directly to the development of concepts related to sets and set theory is relatively minor.

OUTCOME ASSESSMENT

Instructional entries frequently occur in the analysis with no accompanying evaluation entries. In general, this circumstance implies one of the following:

1. Evaluation is deficient.
2. Instruction is primarily in the form of teacher explanation

with little or no independent practice for the pupil.

3. Instruction and practice on a particular outcome cannot be separated from a more inclusive outcome.

4. The outcome is minor in comparison to the amount of instruction given on other skills presented in the unit.

The number of items per skill-per unit averages 3-4 for major skills and 1-3 for minor skills. Item frequencies such as these may be adequate in skill maintenance or retention, but should probably be increased in criterion exercises where acquistion of new or extended skills is assessed.

INDEPENDENT PRACTICE

The amount of independent practice on each outcome can be determined by attending to the numbers in parentheses following underlined and non-underlined page entries. Of primary interest are instances where instructional entries (regular instruction and review) are associated with fewer than ten items of independent practice. The number ten was chosen as a reference point for the analysis since many activities approached but did not exceed this number. It was reasoned that outcomes with fewer than ten items of practice, and particularly outcomes with fewer than five or six items, do not provide sufficient practice for attainment of the skill.

PRELIMINARY SPECIFICATIONS OF A LEARNING MASTERY SYSTEM APPLICATION

CONTENT STRANDS

The strands of content related to the arithmetic of whole and

rational numbers are dominant. This may be inferred by inspecting the number of outcomes developed (as represented by outcome descriptors) and the number of instructional entries per outcome. Outcomes developed in these strands, as well as most of their substrands, usually include at least 10 items of independent practice. Strands such as "Number Sentences" and "Number Theory", contain so many outcome descriptors in common with other strands that it is doubtful their preservation as independent outcome areas in a Learning Mastery System would be worthwhile.

INSTRUCTIONAL OUTCOMES

Five or six broad outcomes such as the following likely will be recommended as a basic outcome structure for the development of Learning Mastery System procedures:

1. Recognize basic elements and concepts
2. Decode systems of symbols
3. Express mathematical relationships
4. Verify mathematical relationships
5. Perform operations
6. Solve verbal problems

One or more of these outcomes represent major skills to be developed in each of content domains such as the following:

I. Sets
II. Whole numbers
III. Rational numbers (positive)
IV. Integers

V. Geometry

VI. Measurement

VII. Logic

Pupil progress through broad instructional sequences for outcomes applicable to each content domain will be monitored throughout the program. At each level, a set of outcome descriptors will further refine cells in the outcome-content matrix to reflect all of the content included in the program for that level.

EVALUATION COMPONENTS

In a number of instances recognition of properties of mathematical operations is introduced through verbal instructions given by the teacher. Pupils are encouraged but not required to recognize these properties in solving related equations or problems. Acquisition of skills such as these should not be assessed in a Learning Mastery System until approximately 10 items of independent practice have been provided in a single chapter.

In chapters where no instruction on new outcomes is begun, the principal outcomes under review will be evaluated. The context for evaluation should include settings which parallel those used during regular instruction, but they should also include some transfer settings which may be generally familiar to the pupil but not in association with the outcome under development. In general, there should not be more than two or three items of the latter type for any particular outcome developed in a chapter.

LMS evaluation components for each level of Heath should include

the following:

1. Four to Six Pretests for Each Level. The number of pretests will be determined by the number of major breaks in the continuity of the instructional sequence. It will not be necessary to develop a pretest for each chapter, since many follow directly from the previous chapter. Essentially, all of the information which might be of value to the teacher can be obtained from posttest or criterion exercise instruments for the previous unit. Pretests should provide a comprehensive sample of behaviors that are prerequisite to the major skills developed in the chapter. The information obtained from the pretest should guide the teacher in determining the relative emphasis to be given any prerequisite behaviors which are reviewed prior to the introduction of new material.

2. En-route Assessment Devices for Each Major Outcome Introduced or Reviewed. A limited number of problems in the regular daily assignment will be identified which the teacher can review as a check on the progress of the pupil toward mastery of the outcome.

3. End-of-Unit Criterion Exercise for Each Unit. Each exercise should include at least one section for each of the major outcomes on which instruction was provided in that unit. Approximately 4-5 items should be included for each individual outcome representing material which has been introduced or extended. One or two items should be included for each descriptor where previously mastered skills have been reviewed or maintained.

Each exercise should include a limited number of problems where

computational skills which have been developed are applied to the solution of verbal problems. The format for all items on the criterion exercise should be multiple choice with at least some of the distractors representing typical errors which might be made on this type of problem.

SWRL-developed instruments are recommended over existing Heath Diagnostic Tests for the following reasons:

(1) Heath Diagnostic Tests are not clearly organized around instructional outcomes.

(2) Many outcome areas are evaluated with fewer than 4 items per instrument.

(3) The constructed response format used with items is incompatible with machine scoring and remedial practice based on typical errors.

(4) Separate Diagnostic Tests are not available for Levels K-2.

PRACTICE COMPONENTS

Appropriate material should be developed for all levels. They will provide practice exercises in the same setting as the textbook. These exercises should be constructed in such a way that teachers can select exercises on the basis of major types of errors committed.

SUPPORT COMPONENTS

Various support components, including a technical manual and appropriate record keeping materials will also be provided.

APPENDIX A

DESCRIPTION OF HEATH COMPONENTS

Heath has designed the set of student's text and accompanying teacher's edition to serve as the core of the mathematics program. A number of additional components are available as follows:

(1) Diagnostic Tests-A battery of tests, averaging 30-40 items per test, is provided on duplicating masters for Levels 3-6. Each test is designed to measure the instructional outcomes of a chapter. Three other tests measure the cumulative outcomes of several consecutive chapters. Test items run parallel to the instructional activities in the textbook.

(2) Basic Worksheets-Remedial practice exercises for Levels 1-6* are provided to assist the slower student to understand the basic mathematical concepts and increase his proficiency in computational skills. The exercises are correlated to the student's textbook, and they are also available on duplicating masters.

(3) Supplementary Worksheets-Enrichment exercises for Levels 1-6 are provided to assist the average and better students extend the topics presented in the textbook to a new setting. They are available in workbooks and on duplicating masters.

*Basic Worksheets for Levels 1-3 were not received from the publisher in time to be included in the analysis.

APPENDIX B

CONTENT ANALYSIS

APPENDIX
D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL K

CHAPTER PAGES	1 1-29	2 30-49	3 50-75	4 76-94
I. STRUCTURE				
II. SETS				
1. Compare sets by indicating				
Equivalent sets	25-26,29(8)[a]			
Non-equivalent sets				
--Fewer	14,16(8)			
--Fewest	23(3)	38(4)	52(3)	
--More	13,15(7)			
--Most	24(2)	37(3)	54(4)	
One to one matching	5-6(6)			
Subsets			65-66,70(10)	
2. Recognize the cardinal number property of a set.				
Sets of 1		30(4)		
" " 2		31(4)		
" " 3		33(4)		
" " 4		34(4)		
" " 5		45(4)		
" " 6			50(4)	
" " 7				76(4)
" " 8				77(3)
" " 9				33(2)
" " 10				86(3)
3. Introduce set operations				
Joining sets[t]				
Separating sets			65-66(10)	82,90(10)
4. Use sets and regions to illustrate one-half.				
Sets			74(2)	
Regions			73-74(8)	

[a]Numerals refer to pages in the student text. Numeral in parentheses indicates the number of problems (to 10) in the chapter in which principal practice is on the outcome described.

[t]Descriptor was included in publisher's scope and sequence, but no specific practice exercises were provided.

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL K

CHAPTER PAGES	1 1-29	2 30-49	3 50-75	4 76-94
III. NUMERATION				
1. Recognize and identify numerals 1-10.	This outcome is implicit in several other outcomes throughout the level K textbook.			
IV. NUMBER				
1. Recognize counting numbers from 1-10.		32,35-36,44,46-49(10)	51,53,58-59,61-64, 69,71-72(10)	78,84,87-88,91, 93(10)
2. Order whole numbers between 1-10.		41(1)	60(2)	
3. Recognize ordinal expressions First Last Middle			 55,57(5) 56-57(4) 57(1)	
4. Compare numbers using sets.	(See II-1)			
5. Use sets to illustrate one-half.	(See II-4)			
V. NUMBER SENTENCES				
VI ADDITION AND SUBTRACTION				
1. Relate set operations to operations on whole numbers.				
Addition-joining sets	(See II-3)			
Subtraction-separating sets.	(See II-3)			
VII. MULTIPLICATION AND DIVISION				
VIII. GEOMETRY				
1. Compare shapes of objects			75(7)	79,85,92(10)

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL K

CHAPTER PAGES	1 1-29	2 30-49	3 50-75	4 76-94
2. Recognize geometric concepts and figures.				
Inside			67-68(10)	81,89(9)
Outside[t]				
Polygons				
--Triangles		40(7)		
--Quadrilaterals		42(9)		
--Rectangles[t]				
--Squares		43(7)		
--Circles	27-28(9)			
IX. MEASUREMENT				
1. Compare heights.				
Taller	2(5)			
Tallest	12(1)			
Shorter[t]				
Shortest	12(1)			
2. Compare size.				
Larger	4(5)			
Largest	21(4)			
Smaller	3(5)			
Smallest	22(4)			
Same	11,17-18(10)			
3. Compare length.				
Longer	9(4)			
Longest[t]				
Shorter	10(6)			
Shortest[t]				
X. PROBLEM SOLVING				
XI. PROBABILITY AND STATISTICS				
1. Read and interpret a bar graph.				80,94(6)
XII. NUMBER THEORY				

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1: CHAPTERS 1-5

CHAPTER PAGES	1 1-24	2 25-52	3 53-70	4 71-94	5 95-132
I. STRUCTURE					
1. Recognize and use basic principles for operations.					
Additive identity (zero)					126 127(10)
Associative law for addition					
Commutative law for addition					117,123(10)
2. Use operation facts on whole numbers to complete square matrix boxes illustrating basic principles.					
Addition boxes					
II. SETS					
1. Complete mathematical equations represented by sets.					
Addition (joining)				71,74(10)	98(4)
Subtraction (separating)				83-84(6)	
2. Use sets and regions to represent fractional numbers.					
Sets					
Regions					
3. Recognize set properties and relations.					
Cardinal number property of sets	11-28(10)				
More-most	7-8(5)				
Subset				71-72(10)	
Equivalent sets	3-4,9-10(10)				
One to one correspondence	1-4,7(10)				
III NUMERATION					
1. Identify place values represented by grouped objects with words (__tens and __ones), and standard numerals.					
To tens place					
To hundreds place					

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1

CHAPTER PAGES	1 1-24	2 25-52	3 53-70	4 71-94	5 95-132
IV. NUMBER					
1. Use numbers and numerals to describe "how many".					
Cardinal numbers to 9	15-16,19,20-24, (10)	26,32-38,40-42, 46-47,52(10)	58-59(10)	91(10)	
Zero		33(3)			
2. Identify missing numerals in counting sequence to 100.					
Numerals in a sequence			64(1)	91(2)	120(10)
Number line			65-66(10)		
3. Represent moves (jumps) of more than one unit on the number line.			67-70(10)		
4. Recognize special numerical relationships and properties.					
Even and odd numbers	(See XII-1)				
Ordinal numbers		35-36(0)			
Fewer	23(3)				
More	23(3)				
Before		31,49(6)			
Between		31,49(8)			
After		31,49(6)			
V. NUMBER SENTENCES					
1. Complete number sentences using symbols <,>,=.			60-61(10)		
2. Write "related number sentences".					
Addition - Subtraction					
3. Supply missing addends and sums for number sentences with frames.				80-81,89-90 (10)	99,101,105-132 (10)

CHAPTER PAGES	1 1-24	2 25-52	3 53-70	4 71-94	5 95-132
4. Write sentences from number line and pictured sets.					
VI. ADDITION AND SUBTRACTION 1. Recognize illustrations of addition, subtraction operations with sets.	(See II-1)				
2. Recognize representations of addition and subtraction with whole numbers on the number line.				75,77,81,85-86 (10)	119-120,122,(10)
3. Read basic addition and subtraction facts for whole numbers through sums to 18.					
One more than	12-14,21(10)	25,27,48(10)		72(8)	
One less than		48(6)		82(8)	
Missing addend					101(10)
Addition, subtraction of 1				73-81,83-84, 87-90(10)	
Addition, subtraction of 2					95-98,102-105 (10)
Sums of 3 to 6					111-112,117-118 (10)121-122,129-132
Sums of 7 to 12					
Practice				77-78,80, 87-90(10)	99-101,106-108, 110,115-116(10)
4. Use algorithms to add whole numbers.					
Addition records --Tens and ones with no regrouping					
Vertical and standard form --2 digit numerals with no regrouping					
Equation form				73-74(10)	
Three addends				80	95(10)

LMS MATH

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1

CHAPTER PAGES	1 1-24	2 25-52	3 53-70	4 71-94	5 95-132
5. Use algorithms to subtract whole numbers.					
Subtraction records					
--Tens and ones with no regrouping					
Vertical and standard form					
--2 digit numerals with no regrouping					
Equation form				83-84(10) 89-90	
VII. MULTIPLICATION AND DIVISION					
1. Relate skip counting to multiplication				91(0)	120(0)
VIII. GEOMETRY					
1. Identify basic geometric concepts, relationships and figures.					
Line segments					
Simple closed curves					
--Inside					
--Outside					
Basic shapes		30(5)	57(4)		
IX. MEASUREMENT					
1. Compare heights					
Taller, tallest			56(3)		
Shorter, shortest					
2. Compare size					
Larger, largest	5(6)		54(6)		
Smaller, smallest	6(6)		53(8)		
Same size			55(6)		

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1

CHAPTER PAGES	1 1-24	2 25-52	3 53-70	4 71-94	5 95-132
3. Measure line segments and objects to the nearest specified unit. Nearest unit Nearest inch Nearest centimeter					
4. Convert various units of measure. Pints to cups Quarts to pints Pounds[t]					
5. Tell time to the nearest half hour.				92-94(10)	
6. Recognize the monetary values of coins through dimes.					
X. PROBLEM SOLVING 1. Write stories for headlines.				80(1)	120(1)
XI. PROBABILITY AND STATISTICS 1. Draw and interpret bar graphs. 2. Collect data.[t]		50(1)	62(1)	79(1)	114(1)
XII. NUMBER THEORY 1. Recognize special properties of numbers. Even and odd numbers					

LMS MATH

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1: CHAPTERS 6-10

CHAPTER PAGES	6 133-166	7 167-204	8 205-218	9 219-243	10 244-252
I. STRUCTURE					
1. Recognize and use basic principles for operations.					
Additive identity (zero)					
Associative law for addition				222,227-228(10)	
Commutative law for addition	162(4)				
2. Use operation facts on whole numbers to complete square matrix boxes illustrating basic principles.					
Addition boxes		201-202(10)		229(8)	
II. SETS					
1. Complete mathematical equations represented by sets.					
Addition (joining)					
Subtraction (separating)		203-204(7)			
2. Use sets and regions to represent fractional numbers.					
Sets			212,214-218(10)		
Regions			211-216,218(10)		
3. Recognize set properties and relations.					
Cardinal number property of sets					
More-most					
Subset					
Equivalent sets					
One to one correspondence		203(6)			
III. NUMERATION					
1. Identify place values represented by grouped objects with words (__tens and __ones), and standard numerals.					
To tens place	133-138,145-153, 159(10)				
To hundreds place					

CHAPTER PAGES	6 133-166	7 167-204	8 205-218	9 219-243	10 244-252
IV. NUMBER					
1. Use numbers and numerals to describe "how many".					
Cardinal numbers to 9					
Zero					
2. Identify missing numerals in counting sequence to 100.					
Numerals in a sequence	155-156(10)				
Number line	139(10)				
3. Represent moves (jumps) of more than one unit on the number line.					
4. Recognize special numerical relationships and properties.					
Even and odd numbers	(See XII-1)				
Ordinal numbers					
Fewer					
More					
Before					
Between					
After					
V. NUMBER SENTENCES					
1. Complete number sentences using symbols <,>,=.	142,165(10)	191(10)			
2. Write "related number sentences".		173,174(10)			
Addition - Subtraction					
3. Supply missing addends and sums for number sentences with frames.		177-183(10)			

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1

CHAPTER PAGES	6 133-166	7 167-204	8 205-218	9 219-243	10 244-252
4. Write sentences from number line and pictured sets.		175,178,180,185 189,193,197,203-204(10)			
VI. ADDITION AND SUBTRACTION					
1. Recognize illustrations of addition, subtraction operations with sets.	(See II-1				
2. Recognize representations of addition and subtraction with whole numbers on the number line.		168,172,180,185-186,189(10)		221,224,230(10)	
3. Read basic addition and subtraction facts for whole numbers through sums to 18.					
One more than	140,157,158(10)				
One less than	141,158(10)				
Missing addend					
Addition, subtraction of 1	139-142(10)				
Addition, subtraction of 2					
Sums of 3 to 6					
Sums of 7 to 12		167-168,171-178 183-188,193-196 (10)		219-220,223-224 227-230(10)	
Practice		169-170,179-182, 185-186,189-192, 197-202(10)		225,229-230 (10)	247
4. Use algorithms to add whole numbers.					
Addition records --Tens and ones with no regrouping					243-245(10)
Vertical and standard form --2 digit numerals with no regrouping					245-247(10)
Equation form					
Three addends					

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1

CHAPTER PAGES	6 133-166	7 167-204	8 205-218	9 219-243	10 244-252
5. Use algorithms to subtract whole numbers.					
Subtraction records					
--Tens and ones with no regrouping					248-251(10)
Vertical and standard form					
--2 digit numerals with no regrouping					251-252(10)
Equation form					
VII. MULTIPLICATION AND DIVISION					
1. Relate skip counting to multiplication.	160(0)				
VIII. GEOMETRY					
1. Identify basic geometric concepts, relationships and figures.					
Line segments				236-238(10)	
Simple closed curves				239(3)	
--Inside				239-240(10)	
--Outside				239-240(10)	
Basic shapes					
IX. MEASUREMENT					
1. Compare heights.					
Taller, tallest					
Shorter, shortest					
2. Compare size.					
Larger, largest					
Smaller, smallest					
Same size					

LMS MATH

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 1

CHAPTER PAGES	6 133-166	7 167-204	8 205-218	9 219-243	10 244-252
3. Measure line segments and objects to the nearest specified unit.					
Nearest unit	143-144(8)				
Nearest inch				233(4)	
Nearest centimeter				234(4)	
4. Convert various units of measure.					
Pints to cups				235(5)	
Quarts to pints				241(3)	
Pounds[t]					
5. Tell time to the nearest half hour.			205-206(10)		
6. Recognize the monetary values of coins through dimes.	163-164(10)		207-210(10)		
IX. PROBLEM SOLVING					
1. Write stories for headlines.		176,203(2)			
XI. PROBABILITY AND STATISTICS					
1. Draw and interpret bar graphs.					
2. Collect data.[t]					
XII. NUMBER THEORY					
1. Recognize special properties of numbers.					
Even and odd numbers				226(2)	

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2: CHAPTERS 1-6

CHAPTERS PAGES	1 1-32	2 33-61	3 62-84	4 85-100	5 101-132	6 133-143
I. STRUCTURE						
1. Recognize and use basic principles for operations.						
Addition identity (zero) t						
Multiplying by one law (identity) t						
Associative (grouping) law for addition.		39(9)			123(4)	
Commutative law for addition	29(6)					
Commutative law for multiplication						
2. Use operation facts on whole numbers to complete square matrix boxes for illustrating basic principles.						
Addition boxes		61(5)				
Addition-subtraction boxes						
II. SETS						
1. Interpret illustrations of mathematical operations with sets.						
Addition (joining)	13-16(10)					
Subtraction (separating)	17-19(10)					
Multiplication						
2. Use sets and regions to represent fractional numbers.						
Sets						140-141(10)
Regions						133-137,141(10)
3. Recognize properties of sets.						
Cardinal number property of sets	1-4,6(10)					
Equivalent sets						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	1 1-32	2 33-61	3 62-84	4 85-100	5 101-132	6 133-143
III. NUMERATION						
1. Identify place values represented by grouped objects with words (_____tens and _____ones), table (tens/ones), and standard numerals.						
To tens place				85-91(10)		
To hundreds place						
IV. NUMBER						
1. Use numbers and numerals to describe "how many".						
Cardinal numbers	2-4(10)					
2. Represent the order of numbers by writing numerals on the number line.						
Counting numbers	10(5)			93(4)		
Jumps on the number line	11-12(10)					
3. Place numerals for counting numbers in order.	2-4,22(10)					
4. Recognize special properties of numbers.						
Even and odd numbers	(See XII-1)					
Ordinal numbers	9(3)	47(6)				
5. Identify relationships between fractional numbers.						
Equivalent fractions						138(6)
V. NUMBER SENTENCES						
1. Complete number sentences using symbols <, >, =.	5(9)	56(10)		94(10)		
2. Write related number sentences.						
Addition	30(2)	36,44,60(10)			105,108,116, 122,125	
Subtraction	30(2)	36,44,60(10)			105,108,116 122,125(10)	
Multiplication						

CHAPTER PAGES	1 1-32	2 33-61	3 62-84	4 85-100	5 101-132	6 132-143
3. Use frames as variables in number sentences.	(Letters and frames are used as variables throughout the test.)					
4. Write number sentences from number line and pictured sets.		59(8)			102(8)	
VI. ADDITION AND SUBTRACTION						
1. Recognize illustrations of addition and subtraction operations with sets.	(See II-1)					
2. Recognize illustrations of addition and subtraction with whole numbers on the number line.	23-26(10)	34-35,50,59,(10)				
3. Recognize basic addition and subtraction facts for whole numbers through sums to 20.						
One more than	7(5)					
One less than	7(5)					
Missing addend	16,20-21(10)					
Sums less than 7	13-33(10)					
Sums of 7, 8, 9 and 10	33-34(10)	41,49,51,57,58(10)				
Sums of 11, 12, 13, and 14					103,107,115,121(10)	
Practice	22,27-28(10)	38,43-46,52,54(10)	74,78,83(10)	99-101(10)	104,109,110,113,116-119,124,130-132	142(10)
4. Use of algorithms to add whole numbers.						
Addition records						
--Tens and ones with no regrouping						
--Hundreds, tens and ones with no regrouping						
--Tens and ones with regrouping						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	1 1-32	2 33-61	3 62-84	4 85-100	5 101-132	6 133-143
Vertical and standard form --2, 3 digit numerals with no regrouping --2, 3 digit numerals with regrouping Expanded form Equation form	13-16,23,24 (10)					
Three addends		37-39(10)				
5. Use algorithms to subtract whole numbers. Subtraction records --Tens and ones with no regrouping --Hundreds, tens and ones with no regrouping --Tens and ones with regrouping Vertical and standard form --2 and 3 digit numerals with no regrouping --2 digit numerals with regrouping Expanded form Equation form	17-21(10)					
VII MULTIPLICATION AND DIVISION 1. Illustrate the multiplication operation with sets.	(See II-1)					
2. Illustrate the multiplication operation on the number line.						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER / PAGES	1 1-32	2 33-61	3 62-84	4 85-100	5 101-132	6 133-143
3. Relate multiplication to repeated addition.						
4. Relate skip counting to the operation of multiplication						
By 2's				95(1)		
By 4's				96(1)		
By 5's				95(1)		
By 10's				86,97,98,(10)	129(5)	
Other				96(1)		
5. Recognize basic multiplication facts for whole numbers through 5 x 9.						
3 as a factor						
4 as a factor						
5 as a factor						
Practice						
Algorithms						
--Equations						
--Vertical form						
VIII GEOMETRY						
1. Recognize and identify basic geometric concepts, relationships and figures.						
Line segment			66(5)			
End points			66(5)			
Simple closed curve						
Polygons						
--Triangle						
--Square			82(3)			
--Rectangle			81-82(8)			
--Side of a figure						
Congruent figures						
--Tracing						
--Fitting						
Diagonals						
Square corners						
Symmetry						
Circle			63-64(1)			
--Radian						
--Diameter						
--Center						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	1 1-32	2 33-61	3 62-84	4 85-100	5 101-132	6 133-143
IX MEASUREMENT						
1. Measure line segments and objects to the nearest specified unit.						
Nearest unit			67-68(8)		128(2)	
Nearest inch			69-73(10)			
Nearest centimeter			70-72(10)			
Nearest foot			75(4)			
2. Measure the area covered by regular and irregular figures by counting square units.						
3. Convert various units of measure.						
Feet to inches						
Yards to feet						
Pints to cups						
Quarts to pints						
4. Tell time to the nearest quarter hour.			62,77(10)			
5. Measure temperature by reading a Fahrenheit thermometer						
6. Recognize the monetary values of coins through quarters						
7. Complete and interpret a month calender.						
X. PROBLEM SOLVING						
1. Solve word problems involving addition and subtraction			84(3)		106,110,120, 127(10)	
2. Write headlines for stories and stories for headlines.			78(1)	94(1)	110,127(2)	

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	1 1-32	2 33-61	3 62-84	4 85-100	5 101-132	6 133-143
XI. PROBABILITY AND STATISTICS						
1. Draw and interpret bar graphs.	8,32(7)	40,48(2)			112,114(5)	143(5)
2. Collect data [t].						
XII. NUMBER THEORY						
1. Recognize special properties of numbers.						
Factors [t]						
Even and odd numbers						

LMS MATH

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	7 144-166	8 167-180	9 181-192	10 193-214	11 215-226	12 227-252
I. STRUCTURE						
1. Recognize and use basic principles for operations.						
Addition identity (zero) t						
Multiplying by one law (identity) t						
Associative (grouping) law for addition						
Commutative law for addition						
Commutative law for multiplication						234(8)
2. Use operation facts on whole numbers to complete square matrix boxes illustrating basic principles.						
Addition boxes	162(8)			209(8)		
Addition-subtraction boxes		171(10)		210(6)		
II. SETS						
1. Interpret illustrations of mathematical operations with sets.						
Addition (joining)						
Subtraction (separating)						
Multiplication						227-228,233 (10)
2. Use sets and regions to represent fractional numbers.						
Sets						
Regions						
3. Recognize properties of sets.						
Cardinal number property of sets						
Equivalent sets						227-228,233(10)

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	7 144-166	8 167-180	9 181-192	10 193-214	11 215-226	12 227-252
III. NUMERATION						
1. Identify place values represented by grouped objects with words (_____tens and _____ones), table (tens/ones), and standard numerals.						
To tens place	151(8)	173(3)				
To hundreds place				193-195,197 (10)		
IV. NUMBER						
1. Use numbers and numerals to describe "how many".						
Cardinal numbers						
2. Represent the order of numbers by writing numerals on the number line.						
Counting numbers						
Jumps on the number line						
3. Place numerals for counting numbers in order.						
4. Recognize special properties of numbers.						
Ordinal numbers						
5. Identify relationships between fractional numbers.						
Equivalent fractions						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	7 144-166	8 167-180	9 181-192	10 193-214	11 215-226	12 227-252
4. Use algorithms to add whole numbers.						
Addition records						
--Tens and ones with no regrouping	145-148(10)					
--Hundreds tens and ones with no regrouping				201(3)		
--Tens and ones with regrouping	152-153(5)					
Vertical and standard form						
--2, 3 digit numerals no regrouping	149(10)			202(10)		
--2, 3 digit numerals with regrouping	154,156,161, 165(10)					
Expanded form	163(4)					
Equation form						
Three addends						
5. Use algorithms to subtract whole numbers.						
Subtraction records						
--Tens and ones with no regrouping		167-169(10)				
--Hundreds, tens and ones with no regrouping				205-206(8)		
--Tens and ones with regrouping		173-175(10)				
Vertical and standard form						
--2 and 3 digit numerals with no regrouping		170(10)		207(8)		
--2 digit numerals with regrouping		176(10)				
Expanded form				210(6)		
Equation form	17-21(10)					

CHAPTER	7	8	9	10	11	12
PAGES	144-166	167-180	181-192	193-214	215-226	227-252
V. NUMBER SENTENCES						
1. Complete number sentences using symbols <, >, =.			198(6)			
2. Write related number sentences.						
Addition						
Subtraction						
Multiplication						230(8)
3. Use frames as variables in number sentences.	(Letters and frames are used as variables throughout the text.)					
4. Write number sentences from number line and pictured sets.						231-232(10)
VI. ADDITION AND SUBTRACTION						
1. Recognize illustrations of addition and subtraction operations with sets.						
2. Recognize illustrations of addition and subtraction with whole numbers on the number line.	144(8)					
3. Recognize basic addition and subtraction facts for whole numbers through sums to 20.						
One more than						
One less than						
Missing addend						
Sums less than 7						
Sums of 7, 8, 9 and 10						
Sums of 11, 12, 13, and 14						
Practice	156,160,161, 165(10)	178,179(10)	184(10)	199,211,212 (10)	224,226(10)	242,247,252(10)

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	7 144-166	8 167-180	9 181-192	10 193-214	11 215-226	12 227-252
VII MULTIPLICATION AND DIVISION						
1. Illustrate the multiplication operation with sets.						
2. Illustrate the multiplication operation on the number line.						231-232(10)
3. Relate multiplication to repeated addition t.						
4. Relate skip counting to the operation of multiplication.						
By 2's						
By 4's						
By 5's						
By 10's				196(3)		
Other				213(3)		
5. Recognize basic multiplication facts for whole numbers through 5 x 9.						
3 as a factor						244-245(10)
4 as a factor						248-249(10)
5 as a factor						238-239(10)
Missing factor						235,245,249,250 (10)
Practice						246,247,(10)
Algorithms						250-252
--Equations						239,245,249(10)
--Vertical form t						
VIII GEOMETRY						
1. Recognize and identify basic geometric concepts, relationships and figures.						
Line segment						
End points						
Simple closed curve						
Polygons						
--Triangle					220-221(5)	
--Square,						
--Rectangle						
--Side of a figure						216(3)
Congruent figures					215-216(9)	
--Tracing					220(2)	
--Fitting					221(3)	
Diagonals					217(8)	

CHAPTER PAGES	7 144-166	8 167-180	9 181-192	10 193-214	11 215-226	12 227-252
Square corners					219(5)	
Symmetry					222,225(3)	
Circle						
--Radian					218(3)	
--Diameter					218(3)	
--Center					218(2)	
IX. MEASUREMENT						
1. Measure line segments and objects to the nearest specified unit.						
Nearest unit						
Nearest inch						
Nearest centimeter						
Nearest foot						
2. Measure the area covered by regular and irregular figures by counting square units.						
3. Convert various units of measure.						
Feet to inches			183(2)			
Yards to feet			183(2)			
Pints to cups			190(5)			
Quarts to pints			190(5)			
4. Tell time to the nearest quarter hour.			185-187(10)			
5. Measure temperature by reading a Fahrenheit thermometer			181(2)			
6. Recognize the monetary values of coins through quarters.	157-160(10)		191-192(10)			
7. Complete and interpret a month calender.				204(1)		
X. PROBLEM SOLVING						
1. Solve word problems involving						
Addition and subtraction	155,164(10)	172,180(10)				236,241(8)
Multiplication						241(2)

D.C.HEATH INSTRUCTIONAL OUTCOMES
LEVEL 2

CHAPTER PAGES	7 144-166	8 167-180	9 181-192	10 193-214	11 215-226	12 227-252
2. Write headlines for stories and stories for headlines.	164(1)					236(1)
XI. PROBABILITY AND STATISTICS 1. Draw and interpret bar graphs.						243(1)
2. Collect data t.						
XII NUMBER THEORY 1. Recognize special properties of numbers.						
Factors t						
Even and odd numbers				214(2)		

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3: CHAPTERS 1-6

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
I. STRUCTURE						
1. Recognize and use basic principles for operations.						
Additive identity (zero)		42(3)/DT(1)[b]				
Multiplying by one law (identity)						139(8)
Multiplying by zero law						139(8)
Zero as a dividend						
Distributive law of multiplication over addition						
Associative (grouping) law for addition		44(10)/DT(2)				
Commutative law for addition		42(6)/DT(2)				
Commutative law for multiplication						140(6)
2. Use operation facts on whole numbers to complete square matrix boxes illustrating basic principles.						
Addition boxes	43,47,57(10)			86,88,90(10)		
Subtraction boxes					119(3)	
II. SETS						
1. Interpret illustrations of mathematical operations with sets.						
Addition (joining)		28(3)				
Subtraction (separating)		29(4)				
Multiplication						135(9)
Division						155 157(10)
2. Use sets and regions to represent fractional numbers.						
Sets						
Regions						

[b]Numerals preceded by DT refer to the number of items, relating specifically to the outcome desired, which appear in the Diagnostic Test for this chapter.

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
III. NUMERATION						
1. Identify place values represented by grouped objects with words (__tens and __ones), tables (tens/ones), and standard numerals.						
To tens place	1-4(10)/DT(3)			84,104(10)		
To hundreds place	6-7(10)/DT(10)			94(8)		
To thousands place	12-14(10)/ DT(2)					
To hundred thousands place	23-24(10)					
To millions place						
2. Relate decimal system measures by rewriting monetary values in different units.	10-11(10) /DT(6)					
IV. NUMBER						
1. Represent the order of numbers by writing numerals on the number line.						
Tens, hundreds, thousands	5,8,15(10)					
Fractions						
2. Recognize special properties of numbers.						
Even and odd numbers	(See XII-1)					
Multiples	(See XII-1)					
Ordinal numbers	9(10)					
Skip counting				108(8)		
Counting by tens,	3-4(10)					
3. Identify relationships between fractional numbers.						
Comparing fractions						
Equivalent fractions						
V. NUMBER SENTENCES						
1. Complete number sentences using symbols <,>,=.	19(10)/DT(4)			87,100(10)		

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
2. Write related number sentences. Addition, subtraction Multiplication, division		32(10)/DT(6)			122(10)	135,140, 155-157(10) /DT(10)
3. Use letters and frames as variables in number sentences.	(Letters and frames are used as variables throughout the text).					
4. Write number sentences to solve verbal problems.	(See X)					
5. Write number sentences from number-line pictures.		31(8)		80,91(10)	114(6)	136(10) /DT(1)
6. Graph addition and multiplication sentences.				92(1)		148(1)
VI. ADDITION AND SUBTRACTION 1. Recognize illustrations of addition and subtraction operations with sets.	(See II-1)					
2. Recognize illustrations of addition and subtraction with whole numbers on the number line.		31(8)		80(8)	114(6)	
3. Recognize the inverse relationship between the operations of addition and subtraction.		53(5)			123(9)	
4. Read basic addition and subtraction facts for whole numbers through sums to 18.		30-35,39,41, 43,45,47-53, 55-59,(10), /DT(10)		113(10)		
5. Use algorithms to add whole numbers. Addition records --Tens and ones with no regrouping --Hundreds, tens and ones with no regrouping				81(10) 82(8)		

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
--Tens and ones with re-grouping				84-85(10)		
--Hundreds, tens and ones with regrouping				96(10)		
Vertical and standard form						
--2, 3 digit numerals with no regrouping				83(10)		
--2, 3 digit numerals with regrouping				86-87,90,97, 100,103,107, 110(10)/DT(10)		
Expanded form				88(4)		
Three addends		45,55,57(10) /DT(5)		93,105(10)		
Computer function model		41,52-53(10)				
Equation form		30-34,42,49-50, 53(10)		91(10)		
Magic squares		60(1)				171(1)
6. Use algorithms to subtract whole numbers.						
Subtraction records						
--Tens and ones with no regrouping[t]						
--Hundreds, tens and ones with no regrouping					115(10)	
--Tens and ones with re-grouping					118-119(10)	
--Hundreds, tens and ones with regrouping					124 125(10)	
Vertical and standard form						
--2 and 3 digit minuends with no regrouping					116(10)	
--2 and 3 digit minuends with regrouping					120,122,126, 128,130,132(10) /DT(10)	
Expanded form[t]						
Computer function model		41,52-53(10)			119(5)	
Equation form		30-34,42, 53(10)			114,122(10)	

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
VII. MULTIPLICATION AND DIVISION						
1. Recognize illustrations of multiplication and division with sets.	(See II-1)					
2. Recognize illustrations of multiplication on the number line.						136,162(10)
3. Relate multiplication to repeated addition.						149(5)
4. Relate division to repeated subtraction.						166(3)
5. Recognize inverse relationship between multiplication and division.						165(3)
6. Recognize basic multiplication and division facts for whole numbers through 9 x 9.						136-133,141-143,146-147,149-150,157-158,162-163,(10)/DT(10)
7. Use algorithms to multiply whole numbers.						
Multiplication records						
--Tens and ones with no regrouping						
--Tens and ones with regrouping						
--Hundreds, tens and ones with no regrouping						
Standard form						
--2 digit with no regrouping						
--2 digit with regrouping						
--3 digit with no regrouping						
--3 digit with regrouping						
Equations						
--Multiplication						156,162(10)
--Multiplication - addition						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
8. Use algorithms to divide whole numbers.						
Missing factor						137,156(10)
Standard (long division) form						
1 digit divisors						
With remainders						
Equations						155-156,162-163(10)
9. Relate division to fractional part of a quantity.						
VIII. GEOMETRY						
1. Recognize and identify basic geometric concepts, relationships and figures.						
Line segment						
End points						
Polygons						
--Triangle						
--Quadrilateral						
--Square						
--Rectangle						
--Side of a figure						
Congruent figures						
Corresponding parts						
Fitting						
Line of symmetry						
Tracing						
Circle						
--Radius						
--Diameter						
--Center						
Cube						
Sphere						
Pyramid						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
IX. MEASUREMENTS						
1. Measure line segments and objects to the nearest specified unit.						
Nearest unit			62(3)			
Nearest inch			63-64,69(10) /DT(4)			
Nearest ½ inch			66,69(10) /DT(3)			
Nearest ¼ inch			67,69,73(10) /DT(1)			
Nearest centimeter			70-71(10) /DT(4)			
Nearest decimeter						
2. Measure the area covered by regular and irregular figures by counting square units.			74-75(10) /DT(6)			
3. Measure the volume of regular and irregular solids by counting cubic units.						
4. Convert various units of measure.						
Decimeters to centimeters						
Pint to quart						
Cup to pint						
Pint to half and full gallon						
Quart to half and full gallon						
Feet to inches						
Yards to feet						
5. Tell time to the nearest minute.	17(10)/DT(3)	38(10)				154,167(10) /DT(3)
6. Measure temperature by reading a Fahrenheit thermometer.						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
7. Recognize the monetary values of coins through half dollars, and one dollar bills.	10-11(10)			98(10)/DT(7)		
8. Recognize and interpret scale measuring weights in pounds.						
9. Estimate the length of line segments and related objects to the nearest inch.			65,73(10)			
X. PROBLEM SOLVING						
1. Solve word problems involving						
Addition and subtraction		36-37,40,46 (10)		101(7)/DT(4)	117,127,131 (10)/DT(4)	
Multiplication and division						144-145,159-161,168(10) /DT(3)
Fractions						
2. Solve word problems involving						
Money	16,18(10)	54(6)/DT(2)		89(10)		
Weight	18(1)					
Time[t]						
Linear measure[t]						
3. Write headlines for stories and stories for headlines.	25(1)	37,40,46,54(4)		101,104(2)	117,127,131 (3)	145,159,161, 168(4)
4. Write equations on a computer card model to solve word problems.				106(6)		
XI. PROBABILITY AND STATISTICS						
1. Draw and interpret.						
Tables[t]						
Bar graphs	21-22(10)					148(1)
Line graphs				92(1)		

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	1 1-27	2 28-61	3 62-79	4 80-113	5 114-133	6 134-171
2. Collect data						
3. Make predictions[t]						
XII. NUMBER THEORY						
1. Recognize special properties of numbers.						
Factors						137-139(10)
Multiples						
Even and odd numbers				108(2)		153(10)
CHAPTER REVIEWS	26(10)	59(10)	76(10)	110(10)	132(10)	170(10)

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3: CHAPTERS 7-11

CHAPTER / PAGE	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
I. STRUCTURE 1. Recognize and use basic principles for operations. Additive identity (zero) Multiplying by one law (identity) Multiplying by zero law Zero as a dividend Distributive law of multiplication over addition Associative (grouping) law for addition Commutative law for addition Commutative law for multiplication			214-217(10)		291(7)
2. Use operation facts on whole numbers to complete square matrix boxes illustrating basic principles. Addition boxes Subtraction boxes					
II. SETS 1. Interpret illustrations of mathematical operations with sets. Addition (joining) Subtraction (separating) Multiplication Division			243(6)		
2. Use sets and regions to represent fractional numbers. Sets Regions		196(10)/DT(3) 194-195(10) /DT(10)			

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGE	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
III. NUMERATION					
1. Identify place values represented by grouped objects with words (__tens and __ones), tables (tens/ones), and standard numerals.					
To tens place					277(10)
To hundreds place					
To thousands place					
To hundred thousands place					
To millions place					288(2)
2. Relate decimal system measures by rewriting monetary values in different units.					
IV. NUMBER					
1. Represent the order of numbers by writing numerals on the number line.					
Tens, hundreds, thousands					
Fractions		202(7)			
2. Recognize special properties of numbers.					
Even and odd numbers					
Multiples					
Ordinal numbers					
Skip counting					
Counting by tens					
3. Identify relationships between fractional numbers.					
Comparing fractions		197(5)			
Equivalent fractions		201,203(10)			
V. NUMBER SENTENCES					
1. Complete number sentences using symbols <,>,=.			237(9)		

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGE	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
2. Write related number sentences. Addition, subtraction Multiplication, division			213,240(10)/DT(3)		
3. Use letters and frames as variables in number sentences.	(Letters and frames are used as variables throughout the text).				
4. Write number sentences to solve verbal problems.	(See X)				
5. Write number sentences from number-line pictures.			241(7)		
6. Graph addition and multiplication sentences.					
VI. ADDITION AND SUBTRACTION					
1. Recognize illustrations of addition and subtraction operations with sets.	(See II-1)				
2. Recognize illustrations of addition and subtraction with whole numbers on the number line.					
3. Recognize the inverse relationship between the operations of addition and subtraction.					
4. Read basic addition and subtraction facts for whole numbers through sums to 18.					
5. Use algorithms to add whole numbers. Addition records --Tens and ones with no regrouping --Hundreds, tens and ones with no regrouping					

CHAPTER PAGE	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
--Tens and ones with regrouping					
--Hundreds, tens and ones with regrouping					
Vertical and standard form					
--2, 3 digit numerals with no regrouping					
--2, 3 digit numerals with regrouping			234(8)		
Expanded form					
Three addends					
Computer function model					
Equation form					
Magic squares					
6. Use algorithms to subtract whole numbers.					
Subtraction records					
--Tens and ones with no regrouping[t]					
--Hundreds, tens and ones with no regrouping					
--Tens and ones with regrouping					
--Hundreds, tens and ones with regrouping					
Vertical and standard form					
--2 and 3 digit minuends with no regrouping					
--2 and 3 digit minuends with regrouping			235(8)		
Expanded form[t]					
Computer function model					
Equation form					

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
VII. MULTIPLICATION AND DIVISION					
1. Recognize illustrations of multiplication and division with sets.	(See II-1)				
2. Recognize illustrations of multiplication on the number line.			223(6)		
3. Relate multiplication to repeated addition.			/DT(1)		
4. Relate division to repeated subtraction.					
5. Recognize inverse relationship between multiplication and division.					
6. Recognize basic multiplication and division facts for whole numbers through 9 x 9.			212,218-219, 225,231-233, 237(10)/DT(10)		277,290-292 (10)
7. Use algorithms to multiply whole numbers.					
Multiplication records					
--Tens and ones with no regrouping					272-273(10) /DT(5)
--Tens and ones with regrouping					278-279(10) /DT(5)
--Hundreds, tens and ones with no regrouping					235(10)
Standard form					
--2 digit with no regrouping					274(10)/DT(5)
--2 digit with regrouping					280-282(10) /DT(5)
--3 digit with no regrouping					286(10)
--3 digit with regrouping					286(10)
Equations					
--Multiplication			213(8)		270-271(10)
--Multiplication - addition			240-241,247, (10)/DT(3)		

CHAPTER PAGES	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
8. Use algorithms to divide whole numbers.					
Missing factor					
Standard (long division) form					
1 digit divisors			232-233,244-246 (10)		294(10)/DT(4)
With remainders			244-246(10)/DT(10)		
Equations					290,292(10)
9. Relate division to fractional part of a quantity.		204-205(10) /DT(6)			
VIII. GEOMETRY					
1. Recognize and identify basic geometric concepts, relationships and figures.					
Line segment	172-173(6)/DT(4)				
End points	172-173(6)/DT(4)				
Polygons					
--Triangle	177-178(2)				
--Quadrilateral	178(5)				
--Square	178(1)/DT(3)				
--Rectangle	178(3)/DT(3)				
--Side of a figure	174(10)				
Congruent figures	180-183(10)/DT(1)				
Corresponding parts	184-185(10)/DT(2)				
Fitting	185(6)				
Line of symmetry	188-191(10)/DT(6)				
Tracing	175(5)/DT(1)				
Circle				258-259(1)	
--Radius				258-259(3)	
--Diameter				258-259(4)	
--Center				258-259(1)	
Cube				268(1)	
Sphere				268(1)	
Pyramid				268(1)	

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
IX. MEASUREMENTS					
1. Measure line segments objects to the nearest specified unit.					
Nearest unit					
Nearest inch					
Nearest ½ inch					
Nearest ¼ inch				265(4)	
Nearest centimeter				265(4)	
Nearest decimeter				256(9)	
2. Measure the area covered by regular and irregular figures by counting square units.			230(5)	254(7)/DT(2)	
3. Measure the volume of regular and irregular solids by counting cubic units.				255(6)/DT(2)	
4. Convert various units of measure.					
Decimeters to centimeters				257(10)/DT(4)	
Pint to quart			228-229(3)	264(3)	
Cup to pint			228-229(3)	264(3)	
Pint to half and full gallon			228-229(3)	264(3)	
Quart to half and full gallon			228-229(3)	264(3)	
Feet to inches				252(10)/DT(3)	
Yards to feet				252(10)/DT(3)	
5. Tell time to the nearest minute.				265(3)	
6. Measure temperature by reading a Fahrenheit thermometer.				262-263(10)/DT(3)	

CHAPTER PAGES	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
7. Recognize the monetary values of coins through half dollars, and one dollar bills.			238(10)		
8. Recognize and interpret scale measuring weights in pounds.				265(3)	
9. Estimate the length of line segments and related objects to the nearest inch.					
X. PROBLEM SOLVING					
1. Solve word problems involving					
Addition and subtraction					
Multiplication and division			220-221,223 234-236,249(10) /DT(4)		276,284(10) /DT(6)
Fractions		198-199,206 (10)/DT(4)			
2. Solve word problems involving					
Money			239(8)		283(10)
Weight					
Time[t]					
Linear measure[t]					
3. Write headlines for stories and stories for headlines.		199(1)	221,223,234, 245,248-249(6)		275,276,281, 284,291,294(10)
4. Write equations on a computer card model to solve word problems.					
XI. PROBABILITY AND STATISTICS					
1. Draw and interpret.					
Tables[t]					
Bar graphs		209-210(4)		261(6)	
Line graphs					

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 3

CHAPTER PAGES	7 172-193	8 194-211	9 212-251	10 252-269	11 270-295
2. Collect data				261(3)	
3. Make predictions[t]					
XII. NUMBER THEORY					
1. Recognize special properties of numbers.					
Factors					
Multiples			224,242(10)		
Even and odd numbers					
CHAPTER REVIEWS	192(10)	208(10)	250(10)	266(10)	295(10)

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4: CHAPTERS 1-7

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
I. STRUCTURE							
1. Recognize and use basic principles for operations.							
Additive identity-zero							
Multiplying by one law (identity)					96(10)		
Multiplying by zero law					96(10)		
Zero as a dividend							
Distributive law of multiplication					109-111(10) /25(7)[c]		176(6) /39(4)
Associative (grouping) law for addition			37(6)				
Commutative law for addition			37(3)				
Associative (grouping) law for multiplication					95(1)		
Commutative law for multiplication					95(4)		
2. Use operation facts on whole numbers to complete square matrix boxes illustrating basic principles.							
Addition boxes			35,38,42 44(10)		99(3)		
Subtraction boxes			35,49-50 54,58(10)				
Multiplication boxes					119(3)		163,178(8)
3. Complete square matrix addition boxes which illustrate basic principles using fractions and mixed numerals.							

[c]Underlined entries refer to pages and items with specific practice in the Basic Worksheet for this level.

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
II. SETS							
1. Interpret illustrations of operations with sets.							
Addition (joining)			32(1)				
Subtraction (separating)			32(1)				
Multiplication					88(6)/19(7)		152-153(7)
Division					101(10) /21-24(10)		
2. Use sets and regions to represent fractional numbers.							
Sets						126-127(10) /26(8)/DT(2)	
Regions						124-125(10) /27(7)/DT(4)	
III. NUMERATION							
1. Identify place values represented by grouped objects with words (__tens and __ones), tables (tens/ones), and standard numerals.							
To hundreds place		20-22(10) /DT(6)/ /1,2(10)					
To thousands place		23-25(10) /DT(8) /3(3)					
To hundred thousands place		24-25(10) /DT(5)					
To millions place		26(10) /DT(1)					
2. Relate Hindu-Arabic and Roman numerals through XXXIX by rewriting.							
Roman to Hindu-Arabic		29(10)					
Hindu-Arabic to Roman		29(10)					

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
3. Relate decimal system measures by rewriting expressions in different units.							
Money (dollars and cents)				80(10)			
Metric system (kilometers, meters and centimeters)				80-81(10)			
IV. NUMBER							
1. Represent the order of numbers by writing numerals on the number line.							
Tens and hundreds		21(2)					
Fractions						128-129(10)	
Mixed numerals							
2. Recognize special properties of numbers.							
Even and odd numbers	(See XII-1)						
Multiples	(See XII-1)						
Factors and common factors	(See XII-1)						
Prime numbers	(See XII-1)						
Perfect numbers	(See XII-1)						
3. Identify relationships between fractional numbers.							
Numerator - denominator						127(10)	
Comparing fractions						125(8) /DT(4)	
Equivalent fractions						129-132(10) 150/DT(7)	
Reducing fractions						133(10) /DT(4)	
Rewriting fractions as mixed numerals							
Rewriting mixed numerals as fractions							

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
V. NUMBER SENTENCES							
1. Complete number sentences using symbols <,>,=.		22(10)/DT(10)			96,113(10)	125(8)	
2. Write related number sentences.							
Addition, subtraction		32-34(10)					
Multiplication, division					88-90,101 (10)/DT(4)		
Fraction, division						142,145(10)	
Multiplication, addition							
3. Use letters and frames as variables in number sentences.	(Letters and frames are used as variables throughout the text).						
4. Write number sentences to solve problems.	(See also X)						171(5)
5. Write number sentences involving units of measure.	(See X-2)						
6. Write number sentences from number-line pictures.			33(8)		89(6)		
7. Recognize the use of parentheses to show grouping.			37-38(10)		95(4)		
8. Graph addition and multiplication sentences.							
VI. ADDITION AND SUBTRACTION							
1. Recognize illustrations of addition and subtraction operations with sets.	(See II-1)						
2. Recognize illustrations of addition and subtraction operations on the number line.							
Whole numbers			33(8)				
Fractional numbers						135-136(10)	
3. Recognize the inverse relationship between the operations of addition and subtraction.					116(5)		

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D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
4. Relate a slide rule model to the operations of addition and subtraction.							
5. Review basic addition and subtraction facts for whole numbers through sums to 18.			34-38(10), /4-7(10)		116(5)		
6. Estimate sums and differences of whole numbers.							
7. Use algorithms to add whole numbers.							
Vertical and standard form							
--2, 3 and 4 digit numerals with no regrouping.			40(10)/8(6) /DT(1)				
--2, 3, 4 and n digit numerals with regrouping			41,42,44,58 (10)/9-10, 18(10)/DT(6)				
Three or more addends			38,39,46,47 (10)/11(9) /DT(2)				
Doubling			48(3)				
Computer function model			51(5)				
Equation form			34(10)				
8. Use algorithms to subtract whole numbers.							
Vertical and standard form							
--2 and 3 digit minuends with no regrouping			49(10)/DT(2) /12(5)				
--3, 4 and n digit minuends with regrouping			/13-17(10) /DT(8)				
Computer function model			51(7)				
Equation form			32-34(10)				

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-53	4 64-87	5 88-123	6 124-151	7 152-185
9. Use algorithms to add and subtract rational numbers. Fractions --Like denominators --Unlike denominators Mixed numerals --Like denominators --Unlike denominators						136-137,148 (10)/28-29 (10)/DT(6) 138-139,148 (10)/30-31 (10)	
VII. MULTIPLICATION AND DIVISION 1. Illustrate the multiplication and division operations with sets.	(See H-1)						
2. Illustrate operations on the number line. Multiplication Division Multiplication-addition					89(10) 104(10)		
3. Relate multiplication to repeated addition.					90(10)		
4. Relate division to repeated subtraction.							
5. Recognize inverse relationship between multiplication and division.					116(5) /DT(2)		
6. Review basic multiplication and division facts through 9 x 9.					88-89,91-94, 105,112,113 (10)/19-24 (10)/DT(10)		

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
7. Multiply by special factors.							
10							165,167(10) /DT(2)
100							166,167(10) /DT(3)
20, 30							169-170(10) /38(4)/DT(4)
8. Estimate products and quotients of whole numbers.							
Products							
Quotients							
9. Use algorithms to multiply whole numbers.							
Multiplication records							
--Tens and ones with no regrouping							153(5)/34(5)
--Tens and ones with regrouping							155(10)/35(5)
--Hundreds, tens and ones with no regrouping							159(10)/36(5)
--Hundreds, tens and ones with regrouping							160(10)/37(5)
Standard form							
--2 digit with no regrouping							154(10)
--2 digit with regrouping							156(10)/40-41 (9)/DT(10)
--3 digit with no regrouping							157(0)/DT(9)
--3 digit with regrouping							161(10)
Equations							
--Multiplication					88,90(10) /DT(10)		
--Multiplication - addition							
Multiplying machine model						140-141(10)	

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4

CHAPTER / PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
10. Use algorithms to divide whole numbers.							
Missing factor					91,102(10)		
Using multiplication facts to aid in division							
Division records							
--Tens and ones with no regrouping							
--Tens and ones with regrouping							
--Hundreds, tens and ones with no regrouping							
--Hundreds, tens and ones with regrouping							
Standard (long division) form							
--1 digit divisors					103(10) /21-24(10)		
--2 digit divisors							
--With remainders (introduction)							
Checking (introduction)							
Equations					101,103(10) /DT(10)		
Division machine model						140-141(10)	
11. Relate division to fractional part of a quantity.						142,144-146(10) /32-33(10) /DT(7)	
VIII. GEOMETRY							
1. Recognize and identify basic geometric concepts, relationships and figures.							
Line segment	1-2(10)/DT(2)						
End points	1-2(10)						
Lines							
Rays							

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LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
Planes	3(4)						
Simple closed curves	4(4)						
Polygons							
--Triangle	5(2)/DT(1)						
--Quadrilateral	5(2)/DT(3)						
--Squares	5(2)/DT(1)						
--Trapazoid	6-7(3)						
--Kite	6(1)/DT(1)						
--Pentagon	7(2)/DT(1)						
--Hexagon	7(2)/DT(1)						
--Octagon	7(2)/DT(1)						
--Diagonals		31(3)					
Congruent figures	8-9(10)/DT(1)						
Corresponding parts	10(3)/DT(2)						
Fitting	11,14-15(10)						
Line of symmetry	12,15(6) /DT(4)						
Turns	16,17(8)						
Tracing	19(9)						
Angles							
--Side							
--Vertex							
Congruent angles							
Right angles							
Perpendicular lines							
Parallel lines							
Circle							
--Radius							
--Diameter							
--Center							
2. Make a scale drawing.							184(1)
IX. MEASUREMENT							
1. Measure line segments to the nearest specified unit.							
Nearest unit				66-68(9)/DT(2)			
Nearest ½ inch				64(7)/DT(2)			
Nearest 1/8 inch				65(10)			
Nearest centimeter				78(10)/DT(1)			
Nearest decimeter				78(4)			

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LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
2. Measure perimeter of polygons.				69(5)/DT(2)			
3. Measure radius, diameter and circumference of circles.				70(6)			
4. Measure the area covered by irregular figures by counting.							
Square units				73(6)/DT(3)			
Square inches				74(2)			
Square centimeters				82-83(7)			
5. Measure the volume of regular and irregular solids by counting.							
Cubic units				76(7)/DT(3)			
Cubic inches				77(4)			
Cubic centimeters				84(4)			
6. Define and convert various units of measure.							
Inches to feet				71(6)/DT(1)			
Feet to yards				71(6)/DT(2)			
Yards to inches				71(6)			
Miles to feet				72(6)			
Square feet to square yards				75(10)			
Decimeters to centimeters				79(4)/DT(2)			
Meters to decimeters and centimeters				79-80(10)/DT(2)			
Kilometers to meters				81(6)			
Dollars to cents				80(10)			
7. Estimate surface area of rectangular solids by counting square units.							
8. Recognize and use measures for,							
Time							
Weight in pounds							
Liquid measure							

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
X. PROBLEM SOLVING							
1. Solve word problems involving.							
Addition and Subtraction			36,43,57(10) /DT(4)		106-107,118 (10)		179(4)
Multiplication and division					108(10) /DT(2)		171,179(8) /DT(4)
Fractions and mixed numerals						143,147(10)	
Estimation							
2. Solve word problems involving.							
Money			60(6)/DT(4)		108(10)		164(10)
Weight			53(4)/DT(1)				
Time[t]							
Linear measure	(See IX-1, 6)						
3. Write headlines for stories and stories for headlines.			36,43,53,57 (4)		106-107,118 (3)	143,147(2)	173(1)
4. Write equations on a computer card model to solve word problems.					117(6)		173(5)
XI. PROBABILITY AND STATISTICS							
1. Draw and interpret.							
Tables[t]							
Bar graphs				86(5)			
Line graphs					120(10) /DT(5)		
2. Collect data[t]							
3. Make predictions.[t]							

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LEVEL 4

CHAPTER PAGES	1 1-19	2 20-31	3 32-63	4 64-87	5 88-123	6 124-151	7 152-185
XIV. NUMBER THEORY 1. Recognize special properties of numbers. Factors and factor trees Common factors Prime numbers Perfect numbers Multiples Even-odd numbers							
CHAPTER REVIEWS	18(10)	30(10)	61(10)	85(10)	121(10)	148(10)	182(10)
CUMULATIVE TEST				DT(10)			DT(10)

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D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4: CHAPTERS 8-13

CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
I. STRUCTURE 1. Recognize and use basic principles for operations. Additive identity-zero Multiplying by one law (identity) Multiplying by zero law Zero as a dividend Distributive law of multiplication Associative (grouping) law for addition Commutative law for addition Associative (grouping) law for multiplication Commutative law for multiplication	188(9)					
2. Use operation facts on whole numbers to complete square matrix boxes illustrating basic principles. Addition boxes Subtraction boxes Multiplication boxes	216(3)					
3. Complete square matrix addition boxes which illustrate basic principles using fractions and mixed numerals.				258-261(9)		

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LEVEL 4

CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
II. SETS						
1. Interpret illustrations of operations with sets.						
Addition (joining)						
Subtraction (separating)						
Multiplication						
Division						
2. Use sets and regions to represent fractional numbers.						
Sets						
Regions						
III. NUMERATION						
1. Identify place values represented by grouped objects with words (__tens and __ones), tables (tens/ones), and standard numerals.						
To hundreds place						
To thousands place						
To hundred thousands place						
To millions place						
2. Relate Hindu-Arabic and Roman numerals through XXXIX by rewriting.						
Roman to Hindu-Arabic						
Hindu-Arabic to Roman						

D.C. HEATH INSTRUCTIONAL OUTCOMES
LEVEL 4

CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
3. Relate decimal system measures by rewriting expressions in different units.						
Money (dollars and cents)						
Metric system (kilometers, meters and centimeters)						
IV. NUMBER						
1. Represent the order of numbers by writing numerals on the number line.						
Tens and hundreds						
Fractions						
Mixed numerals				253-254(10)		
2. Recognize special properties of numbers.						
Even and odd numbers	(See XII-1)					
Multiples	(See XII-1)					
Factors and common factors	(See XII-1)					
Prime numbers	(See XII-1)					
Perfect numbers	(See XII-1)					
3. Identify relationships between fractional numbers.						
Numerator - denominator						
Comparing fractions						
Equivalent fractions						
Reducing fractions		232-233(10) /DT(5)				
Rewriting fractions as mixed numerals				260-261(10) /55(7)/DT(8)		
Rewriting mixed numerals as fractions				253-255(10) 258/54(7)/DT(8)		

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CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
V. NUMBER SENTENCES						
1. Complete number sentences using symbols <,>,=.						
2. Write related number sentences. Addition, subtraction Multiplication, division Fraction, division Multiplication, addition	186(6) 189-190(10) /DT(3)					
3. Use letters and frames as variables in number sentences.	(Letters and frames are used as variables throughout the text).					
4. Write number sentences to solve problems.	(See also X) 215(10)					
5. Write number sentences involving units of measure.	(See X-2)					
6. Write number sentences from number-line pictures.						
7. Recognize the use of parentheses to show grouping.						
8. Graph addition and multiplication sentences.						
VI. ADDITION AND SUBTRACTION						
1. Recognize illustrations of addition and subtraction operations with sets.	(See II-1)					
2. Recognize illustrations of addition and subtraction operations on the number line. Whole numbers Fractional numbers						
3. Recognize the inverse relationship between the operations of addition and subtraction.						

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CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
4. Relate a slide rule model to the operations of addition and subtraction.				267(6)		
5. Review basic addition and subtraction facts for whole numbers through sums to 18.						
6. Estimate sums and differences of whole numbers.			239-240(10) /DT(10)			
7. Use algorithms to add whole numbers. Vertical and standard form --2, 3 and 4 digit numerals with no regrouping --2, 3, 4 and n digit numerals with regrouping Three or more addends Doubling Computer function model Equation form						
8. Use algorithms to subtract whole numbers. Vertical and standard form --2 and 3 digit minuends with no regrouping --3, 4 and n digit minuends with regrouping Computer function model Equation form						

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CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
9. Use algorithms to add and subtract rational numbers.						
Fractions						
--Like denominators				256(10)		
--Unlike denominators						
Mixed numerals						
--Like denominators				263(10)/56-57 (10)/DT(8)		
--Unlike denominators				264(10)/58(5)		
VII, MULTIPLICATION AND DIVISION						
1. Illustrate the multiplication and division operations with sets.	(See II-1)					
2. Illustrate operations on the number line.						
Multiplication						
Division						
Multiplication-addition						
3. Relate multiplication to repeated addition.						
4. Relate division to repeated subtraction.						
5. Recognize inverse relationship between multiplication and division.						
6. Review basic multiplication and division facts through 9 x 9.	193(10)					

CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
7. Multiply by special factors. 10 100 20, 30						
8. Estimate products and quotients of whole numbers. Products Quotients			242-243(10) /DT(5) 246-247(10) /DT(3)			
9. Use algorithms to multiply whole numbers. Multiplication records --Tens and ones with no regrouping --Tens and ones with regrouping --Hundreds, tens and ones with no regrouping --Hundreds, tens and ones with regrouping Standard form --2 digit with no regrouping --2 digit with regrouping --3 digit with no regrouping --3 digit with regrouping Equations --Multiplication --Multiplication - addition Multiplying machine model	189-190(10) /DT(3)					

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CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
10. Use algorithms to divide w[illegible] numbers.						
Missing factor						
Using multiplication facts to aid in division	193(6)					285-286(10) 288-289/DT(10)
Division records						
--Tens and ones with no regrouping	199(10)/DT(2) /44(5)					
--Tens and ones with regrouping	202-204(10) /DT(2)/45-46 (8)					
--Hundreds, tens and ones with no regrouping	199(9)/DT(1)					
--Hundreds, tens and ones with regrouping	207-210(10) /47-48(8) /DT(2)					/59-60(8)
Standard (long division) form						
--1 digit divisors	186,213(10) /DT(10)					284(10) /DT(5)
--2 digit divisors						285-291(10) /59-60(8)
--With remainders (introduction)	191,194-195 (10)/42-43(10) /DT(10)					
--Checking (introduction)	195,216(10)					
Equations	186(6)		245(10)			
Division machine model						
11. Relate division to fractional part of a quantity.						
VIII. GEOMETRY						
1. Recognize and identify basic geometric concepts relationships and figures.						
Line segment					271(2)/DT(3)	
End points						
Lines					269,271(7) /DT(1)	
Rays					268,271(10) /DT(3)	

CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
Planes						
Simple closed curves						
Polygons						
--Triangle						
--Quadrilateral						
--Squares						
--Trapazoid						
--Kite						
--Pentagon						
--Hexagon						
--Octagon						
--Diagonals						
Congruent figures						
Corresponding parts						
Fitting						
Line of symmetry						
Turns						
Tracing						
Angles					272-274(5) /DT(2)	
--Sides					272(1)	
--Vertex					272(2)	
Congruent angles					273,275(1) /DT(3)	
Right angles					278(6)/DT(2)	
Perpendicular lines					276(6)/DT(2)	
Parallel lines					277(6)/DT(3)	
Circle						
--Radius					279(5)/DT(1)	
--Diameter					279(3)/DT(1)	
--Center					279(2)/DT(1)	
2. Make a scale drawing.						
IX. MEASUREMENT						
1. Measure line segments to the nearest specified unit.						
Nearest unit						
Nearest ½ inch						
Nearest 1/8 inch						
Nearest centimeter						
Nearest decimeter						

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CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 234-294
2. Measure perimeter of polygons.						
3. Measure radius, diameter and circumference of circles.						
4. Measure the area covered by irregular figures by counting. Square units Square inches Square centimeters						
5. Measure the volume of regular and irregular solids by counting. Cubic units Cubic inches Cubic centimeters						
6. Define and convert various units of measure. Inches to feet Feet to yards Yards to inches Miles to feet Square feet to square yards Decimeters to centimeters Meters to decimeters and centimeters Kilometers to meters Dollars to cents						
7. Estimate surface area of rectangular solids by counting square units.			250(1)			
8. Recognize and use measures for, Time Weight in pounds Liquid measure						

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CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
X. PROBLEM SOLVING						
1. Solve word problems involving.						
Addition and subtraction						
Multiplication and division	187,192,217(10)/DT(2)	225(10)				287(8)
Fractions and mixed numerals		234(10)		265(8)/DT(2)		
Estimation			241,243,244(10)/DT(4)			
2. Solve word problems involving.						
Money	196(5)					
Weight						
Time[t]						
Linear measure	(See IX-1,6)					
3. Write headlines for stories and stories for headlines.	187(1)					287(1)
4. Write equations on a computer card model to solve word problems.						
XI. PROBABILITY AND STATISTICS						
1. Draw and interpret.						
Tables[t]						
Bar graphs		234(5)				292(8)
Line graphs						
2. Collect data.[t]						
3. Make predictions.[t]						

LMS MATH

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LEVEL 4

CHAPTER PAGES	8 186-221	9 222-237	10 238-251	11 252-267	12 268-283	13 284-294
XII. NUMBER THEORY						
1. Recognize special properties of numbers.						
Factors and factor trees		226,229,236(10) /DT(10)				
Common factors		231(10) /51-52(8)/DT(5)				
Prime numbers		228(7)/DT(10)				
Perfect numbers		236(2)				
Multiples		222(10) /49-50(8) /DT(10)				
Even-odd numbers		223-224(10) /DT(6)				
CHAPTER REVIEWS	219(10)	235(10)	249(10)	266(10)	281(10)	294(10)
CUMULATIVE TEST						DT(10)

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LEVEL 5: CHAPTERS 1-7

CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
I. STRUCTURE							
1. Recognize the laws of mathematical operations.							
The order law (commutativity)							
--For addition		32-3(10) /7(8)/DT(1)					
--For multiplication		32-3(1) /DT(1)					
The grouping law (associativity)							
--For addition		32-3(10) /DT(1)					
--For multiplication		32-3(1)/DT(1)					
The adding 0 law		32-3(1)/DT(1)					
The distributive law for multiplication					98-9(10) /20(4)		
The multiplying by 1 law		32-3(1)/DT(1)					
The multiplying by 0 law							
Properties of 1 in multiplication and division of fractions							
Reciprocals							
2. Complete operation boxes.							
Addition boxes				61-2(10)			
Addition-subtraction boxes				69(6)			
Multiplication boxes					88 101(9)		

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LEVEL 5

CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
II. SETS							
1. Recognize sets from description or roster.							
Brace notation							
Members of a set							
Subsets							
2. Describe the intersection of sets ($\cap$).							
3. Identify different sets of numbers.							
Sets of factors							
Sets of multiples							
4. Recognize special sets.							
Empty sets							
Infinite sets							
5. Relate sets and regions to fractional numbers.							
6. Relate sets and regions to operations.							
Multiplication					80-1(10) /16-21(10)		
Division							139(3) /26-8(10)
III. NUMBER AND NUMERATION							
1. Represent numbers on an abacus.	1(3)						
2. Read and write numerals.							
To thousands	1-2(10)/1-2(10)/DT(3)						
To hundred thousands	2(4)/DT(1)						
To millions	4-5(10)/DT(4)						
To billions	6(10)/DT(5)						

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
3. State the place value of a digit.							
In a whole number	1-7(10)						
In a decimal fraction							
4. Represent numerals in different forms.							
Expanded form	1-2(8)						
Standard form	1-6(10)/1-2 (10)/DT(6)						
Exponential form							
5. Recognize fractional numbers in common form.							
Numerator/Denominator							
Equivalent fractions							
Mixed numerals							
Improper fractions							
6. Recognize fractional numbers in decimal form.							
Decimal point							
Tenths							
Hundredths							
7. Relate fractional numbers in common form to							
Regions							
Whole numbers							
Mixed numerals							
Fractions in decimal form							
8. Convert decimal numerals to							
Roman numerals to M	9(10)/DT(10)						
Base-5 numerals	10-14(10)						

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 133-175
9. Use the number line to represent Fractional numbers Decimal numbers Mixed numerals Multiples Mathematical operations --Addition --Subtraction							
10. Graph a set of number pairs on a number plane.		34-5(10)					
IV. NUMBER SENTENCES							
1. Identify relational symbols <,>,=.	8(10)/2(4) /DT(9)						
2. Use parentheses to show grouping.		32-3(10)					
3. Use relational symbols to compare numbers. Whole numbers	8(10)/2(4) /DT(9)						
Fractional numbers							
4. Identify true, false, and open sentences.[t]							
5. Identify related operation sets in verbal sentences. Addition-subtraction of whole numbers		24-5,28(10) /DT(3)					
Multiplication-division of whole numbers		24-5,28(10) /DT(3)					
Multiplication-division of fractional numbers							

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
6. Translate verbal sentences to number sentences and expressions.		27(4)					
7. Write and solve number sentences involving Whole numbers Fractional numbers Areas and volumes		26(10)/DT(6)			80-1(10)		
8. Identify the order of operations in solving multiplication-addition equations.[t]							
V. ADDITION AND SUBTRACTION 1. Recall basic facts.		20(10)3-4(10) /DT(7)					
2. Add-subtract with whole numbers. Addition with 2, 3, 4-digit numbers --Standard form --With regrouping				58-62(10) 59-62(10) /DT(3)			
--Expanded form[t] --Equation form[t] --Table form --With regrouping --More than two addends				/10(9) /10-11(10) 63(10)/13(9) /DT(1)			
Subtraction with 2, 3-digit numbers --Equation form[t] --Standard form --With regrouping				68-9,73(10) /14-15(10) /DT(4)			

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
3. Add-subtract with fractional numbers. Fractional numbers less than 1 --Like denominators --Unlike denominators Mixed numerals --Like denominators --With regrouping --Unlike denominators --With regrouping							
4. Add-subtract with decimal fractions. Addition --Table form --Standard form Subtraction --Table form --Standard form							
5. Add-subtract with 4, 6-clock numerals.							
6. Estimate sums and differences.				66-7,73(10)			
VI. MULTIPLICATION AND DIVISION							
1. Recall basic facts.		21-2,31(10) /5-6(10) /DT(10)	55(10)	72(10)	/16(8)		
2. Multiply-divide with whole numbers. Multiplication with 2, 3-digit and 1-digit factors							

CHAPTER	1	2	3	4	5	6	7
PAGES	1-15	16-37	38-57	58-79	80-111	112-137	138-175
--Table form					81-3(10) /17(6)/DT(4)		
--With regrouping					83(10)/18(6) /DT(4)		
--Standard form					84-5,88(10) /DT(5)		
Multiplication with 2, 3-digit and 10 or 100 as factors							
--Table form					89(3)		
--Standard form					89-90(10) /DT(5)		
--Shortcut form					91(10)		
Multiplication with 2, 3-digit and multiples of 10 as factors							
--Standard form					92-3,95 103. 103(10)/19 (4)/DT(5)		
--Shortcut form					96,106(10)		
Multiplication with 2, 3-digit factors							
--Standard form					101,107,109 (10)/DT(5)		
--Shortcut form					100 106(10) /21(3)		
--Using the distributive law					98-99(10) /20(4)		
Division with 2, 3-digit dividends and 1-digit divisions							
--Standard form							139-140 146 155 /26-7(10) /DT(10)

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
--Table form							144-5/28-9 (10)
--With regrouping							149-53/30-1 (10)/DT(8)
--Shortcut form							154,168(10)
--Long form[t]							
Division with 3, 4-digit dividends and 2-digit divisors							
--Standard form							169-70,172 (10)/DT(4)
--Using multiplication facts							164-5(10)
--Table form							32-33(8)
Division with numerals involving zero							156(10)/29(2) /DT(2)
3. Multiply-divide with fractional numbers.							
Multiplication with fractional numbers							
--One factor a whole number							
--Both factors fractions							
Division with fractional numbers							
--One factor a whole number							
--Both factors fractions							
4. Estimate products and quotients.					103,109(10)		157,167(10)
VII. GEOMETRY							
1. Identify basic figures.							
Points			38(0)/DT(1)				
--End point			39(0)				
Rays			39(2)/DT(1)				
Segments			39(1)/DT(1)				
--Parallel			54(6)				
--Midpoint			57(1)				

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	CHAPTER	1	2	3	4	5	6	7
	PAGES	1-15	16-37	38-57	58-79	80-111	112-137	138-175
2.	Perform measurements.							
	Linear							
	--Line segments						112,114,116 (10)/22-3(10) /DT(5)	
	--Perimeters						113,128(10)	
	--Geographic distance				76(10)	97(4)		
	Estimate widths				65(8)			
	Area							
	--Regions							
	--Unit count						/24(6)	
	--Rectangle							
	--Formula						118-9,128-9 (10)/DT(1)	
	--Square							
	--Formula						120-1,128-9 (10)/DT(1)	
	--Parallelogram							
	--Unit count						122(2)	
	--Formula						122(6)/DT(1)	
	--Triangle							
	--Formula						123(6)/DT(1)	
	Volume							
	--Rectangular cube							
	--Unit count						124(7)/25(6)	
	--Formula						126(6)/DT(1)	
	--Cube							
	--Formula						127(5)/DT(1)	
	Angle						131-3(10) /DT(2)	
	Force and pressure							171(8)

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
VIII. MEASUREMENT							
1. Identify and interrelate units of measurement.							
Length							
--Metric system							
--Millimeter						114,116(10)/23(6)/DT(1)	
--Centimeter						114,116(10)/22(6)	
--Decimeter						116(10)	
--Meter						116(1)	
--Kilometer						116(1)	
--English System							
--Inch						112,129(5)/DT(4)	
--Foot						112,129(10)	
--Yard						112,129(7)	
--Mile						112(2)	
Area						117-9(2)/DT(1)	
--Square centimeter						117(1)/DT(1)	
--Square inch						117-8(1)/DT(1)	
--Square foot						117-8(1)/DT(1)	
--Square yard							
Volume							
--Cubic centimeter						125(3)/DT(1)	
--Cubic inch						125(1)/DT(1)	
Angle							
--Degree						132-3(10)/DT(2)	
--Unit angle						131(6)	
Time							
--Decade							
--Century							
Temperature							
--Degree		37(1)					

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
Lines			38(5)/DT(1)				
--Perpendicular			47,57(8)/DT(1)				
--Perpendicular bisector			57(1)				
--Parallel			54(6)/DT(1)				
Angles			39(4)/DT(1)				
--Sides			39(0)				
--Vertex			39(0)				
--Right			47(0)/DT(1)				
--Bisector							
--Congruent			40-1,54(4)				
Plane			38(5)				
2. Recognize geometric shapes.							
Triangles							
--Isosceles			50-1(2)/DT(1)				
--Base						122-3(0)	
--Equitateral			50-1(2)/DT(1)				
--Scalene			50-1(2)/DT(1)				
Quadrilaterals							
Polygon[t]							
Rectangle						118-9(10)	
Square						121-2(10)	
Trapezoid[t]							
Parallelogram						122(8)	
Circle						113(1)	
--Circumference						113(1)	
--Diagrams							
--Arc			51(1)				
Hexagon							
Octagon							
--Perimeter						113(10)	
Regular figure							
3. Recognize closed surfaces.							
Cube						127,136(10)	
--Edge						127(0)	
Rectangular solid						126(6)	
Tetrahedron							
Hexahedron							

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CHAPTER / PAGES	1 1-15	2 16-37	3 38-57	4 58 79	5 80-111	6 112-137	7 138-175
4. Match geometric figures.							
Congruency			40-3(10)/8(6) /DT(2)				
--Fittings			41-3(5)/DT(2)				
--Face-up			40(2)/DT(1)				
--Face-down			42(1)				
--On itself			44,52-3(10)				
--Corresponding parts			44,52-3(10)				
--Tracing			41,44,52-3(10) /DT(3)				
Symmetry							
--Line of symmetry			45-6,48-9(10) /DT(3)				
--Turns			52-3(10)/DT(1)				
--Center			52-3(10)/DT(1)				
--Tracing			44-5(10)				
5. Construct geometric figures.							
Segments			51(1)			116(10)	
Triangles			51(3)/DT(2)				
Circles				78(1)			
Parallel lines[t]							
Scale drawing							
Perpendicular bisector			57(1)				
Regular hexagon							
Angle bisector							
Octagon							
Hexagon							
Curve stitching				77(8)			175(6)
Eclipse				78(1)			
6. Use devices for geometric constructions.							
Straight edge			51,57(8)				
Compass			51,57(8)				
Protractor						132-3(10) /DT(2)	

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
IX. FUNCTIONS							
1. Recognize function rules involving mathematical operations.							
Addition		16-19,28(8)/DT(5)					
Subtraction		16-19,28(8)/DT(9)					
Multiplication		16-19,28(10)/DT(5)					
Division		16-19,28(10)/DT(1)					
2. Draw graphs on number planes.							
For number pairs		34-5,37(10)					
For function rules							
X. PROBLEM SOLVING							
1. Write headlines for stories (vice versa)							
2. Solve problems using mathematical operations.							
Addition and subtraction							
--Whole numbers				71(8)/DT(8)			
--Fraction							
--Decimals							
Multiplication and division							
--Whole numbers			55(6)		86,94,104,108-9(10)/DT(6)	121,128(10)	140-1,147,153,159,166,172(10)/DT(7)
--Fractions							

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
3. Solve problems related to Motion Rates Ratios Averages							160-1,170 (10)
XI. PROBABILITY AND STATISTICS 1. Draw and/or interpret graphs. Sum graphs Line graphs Pictograms Factor graphs							142(5)
2. Predict the probability of events.							
3. Calculate the average of a set of numbers.							160-1,170 (10)
XII. NUMBER THEORY 1. Recognize special sets of numbers. Even and odd numbers Square numbers Prime numbers Factors of a number --Common factors --Greatest common factor --Factor trees --Factor graphs Multiples of a number --Common multiples Exponents Number pairs Number sequences Ratios		18,34-5(10) /DT(10)					

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CHAPTER PAGES	1 1-15	2 16-37	3 38-57	4 58-79	5 80-111	6 112-137	7 138-175
2. Reduce numerical expressions to lower and lowest terms.		30(10)					
CHAPTER REVIEWS	14(10)	36(10)	56(10)	77(10)	110(10)	135(10)	174(10)

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LEVEL 5: CHAPTERS 8-13

CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
I. STRUCTURE						
1. Recognize the laws of mathematical operations.						
The order law (commutativity)						
--For addition						
--For multiplication						
The grouping law (associativity)						
--For addition						
--For multiplication						
The adding 0 law						
The distributive law for multiplication						
The multiplying by 1 law						
The multiplying by 0 law[t]						
Properties of 1 in multiplication and division of fractions						289(8)
Reciprocals						290(8)
2. Complete operation boxes.						
Addition boxes			233,238(9)			
Addition-subtraction		217(3)				
Multiplication boxes						287(3)

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
II. SETS						
1. Recognize sets from description or roster.						
Brace notation Members of a set Subsets	183(10)/DT(1)					
2. Describe the intersection of sets ($\cap$).	182-3(10) /DT(2)					
3. Identify different sets of numbers.						
Sets of factors	176(10)/34(10) /DT(10)					
Sets of multiples	186-7(10) /35(10)/DT(8)					
4. Recognize special sets.						
Empty sets	183(10)					
Infinite sets						
5. Relate sets and regions to fractional numbers.		196-7(10)/36-8 (10)/DT(4)				
6. Relate sets and regions to operations.						
Multiplication						285-6(10) /55(6)/DT(6)
Division						290(8)/ 0(6)
III. NUMBER AND NUMERATION						
1. Represent numbers on an abacus.						
2. Read and write numerals.						
To thousands To hundred thousands To millions To billions						

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
3. State the place value of a digit.						
In a whole number						
In a decimal fraction					262-3,268-9 (10)/DT(5)	
4. Represent numerals in different forms.						
Expanded form						
Standard form						
Exponential form	188(10)/DT(10)					
5. Recognize fractional numbers in common form.		196-7,208(10) /36-9(10)/DT(4)				
Numerator/Denominator		205(0)				
Equivalent fractions		204-5,208,209 (10)/40(8) /DT(6)				
Mixed numerals			224-31(10) /47-8(10) /DT(10)			
Improper fractions			224-5(0) /47-8(0)			
6. Recognize fractional numbers in decimal form.						
Decimal point					263-4(10)/DT(10)	
Tenths					262-7(10)/54(8) /DT(9)	
Hundredths					268-9(10)/55(8) /DT(4)	
7. Relate fractional numbers in common form to						
Regions		196(10)/36(9) /DT(2)				
Whole numbers			224-5(10)			
Mixed numbers			226-31(10) /47-8/DT(10)			
Fractions in decimal form			266,270(10)			
8. Convert decimal numerals to						
Roman numerals to M						
Base-5 numerals						

CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
9. Use the number line to represent						
Fractional numbers		208(10)				
Decimal numbers					270(10)	
Mixed numerals			224,226(10)			
Multiples	186(2)					
Mathematical operations						
--Addition		213(7)				
--Subtraction		213(7)				
10. Graph a set of number pairs on a number plane.						
IV. NUMBER SENTENCES						
1. Identify relational symbols <,>,=.						
2. Use parentheses to show grouping.						
3. Use relational symbols to compare numbers.						
Whole numbers						
Fractional numbers		210-1(10)/DT(8)		56(6)		
4. Identify true, false, and open sentences.						
5. Identify related operation sets in verbal sentences.						
Addition-subtraction of whole numbers						
Multiplication-division of whole numbers						
Multiplication-division of fractional numbers		198-9(10)				

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
6. Translate verbal sentences to number sentences and expressions.						
7. Write and solve number sentences involving						
Whole numbers						
Fractional numbers		199(6)/41-5(10) /DT(9)				
Areas and volumes		199(3)				284-5(10) /DT(1)
8. Identify the order of operations in solving multiplication-addition equations.[t]						
V. ADDITION AND SUBTRACTION						
1. Recall basic facts.						
2. Add-subtract with whole numbers.						
Addition with 2, 3, 4-digit numbers						
--Standard form						
--With regrouping						
--Expanded form[t]						
--Table form						
--With regrouping						
--More than two addends						
Subtraction with 2, 3-digit numbers						
--Equation form[t]						
--Standard form						
--With regrouping						

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
3. Add-subtract with fractional numbers.						
Fractional numbers less than 1						
--Like denominators		213(10)/41-2 (10)/DT(4)				
--Unlike denominators		214-21(10) /43-46(10) /DT(5)				
Mixed numerals						
--Like denominators			237(10)/DT(5)			
--With regrouping			238(10)/51-2 (10)/DT(5)			
--Unlike denominators			239(10)			
--With regrouping			241(10)/51-2 (10)/DT(2)			
4. Add-subtract with decimal fractions.						
Addition						
--Table form					57(6)	
--Standard form					272(10)/DT(3)	
Subtraction						
--Table form						
--Standard form					273(10)/58(6) /DT(3)	
5. Add-subtract with 4, 6-clock numerals.	190-1(10)					
6. Estimate sums and differences.						
VI. MULTIPLICATION AND DIVISION						
1. Recall basic facts.						
2. Multiply-divide with whole numbers.						
Multiplication with 2, 3-digit and 1-digit factors						

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
--Table form						
--With regrouping						
--Standard form						
Multiplication with 2, 3-digit and 10 or 100 as factors						
--Table form						
--Standard form						
--Shortcut form						
Multiplication with 2, 3-digit and multiples of 10 as factors						
--Standard form						
--Shortcut form						
Multiplication with 2, 3-digit factors						
--Standard form						
--Shortcut form						
--Using the distributive law						
Division with 2, 3-digit dividends and 1-digit divisions						
--Standard form						

CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
--Table form --With regrouping --Shortcut form --Long form Division with 3, 4-digit dividends and 2-digit divisors --Standard form --Using multiplication facts --Table form Division with numerals involving zero						
3. Multiply-divide with fractional numbers. Multiplication with fractional numbers --One factor a whole number --Both factors fractions		201-3(10)/39(8) /DT(8)				287(10) /DT(1) 286-?(10) /59(10) /DT(5)
Division with fractional numbers --One factor a whole number --Both factors fractions						290-3(10) /60(6)/DT(4) 290-3(10) /DT(4)
4. Estimate products and quotients.						
VII. GEOMETRY 1. Identify basic figures. Points --End point Rays Segments --Parallel --Midpoint						

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CHAPTER / PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
Lines						
--Perpendicular					278(2)	
--Perpendicular bisector			245(1)			
Parallel					278(2)	
Angles						
--Sides						
--Vertex						
--Right						
--Bisector			245(1)			
--Congruent						
Plane						
2. Recognize geometric shapes.						
Triangles						
--Isosceles						
--Base					277(10)/DT(2)	
--Equitateral					277(10)/DT(2)	
--Scalene					277(10)/DT(2)	
Quadrilaterals						
Polygon[t]						
Rectangle						
Square						
Trapezoid[t]						
Parallelogram						
Circle						
--Circumference						
--Diagrams						
--Arc	182-3(10)					
Hexagon		223(1)				
Octagon			245(1)			
--Perimeter						
Regular figure					281(1)283(1)	
3. Recognize closed surfaces.						
Cube						
--Edge						
Rectangular solid						
Tetrahedron					283(3)	
Hexahedron					283(3)	

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
4. Match geometric figures.						
Congruency					276(9)/DT(1)	
--Fittings						
--Face-up						
--Face-down						
--On itself						
--Corresponding parts						
--Tracing						
Symmetry						
--Line of symmetry					278-9,281(10) /DT(3)	
--Turns						
--Center						
--Tracing						
5. Construct geometric figures.						
Segments						
Triangles						
Circles		223(1)				
Parallel lines[t]						
Scale drawing			243(6)	253(6)		
Perpendicular bisector						
Regular hexagon		223(1)				
Angle bisector			245(1)			
Octagon			245(1)			
Hexagon		223(1)				
Curve stitching						
Eclipse						
6. Use devices for geometric constructions.						
Straight edge						
Compass						
Protractor						

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	CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
2.	Perform measurements.						
	Linear						
	--Line segments						
	--Perimeters						
	--Geographic distance						
	Estimate widths						
	Area						
	--Regions						
	--Unit count						
	--Rectangle						
	--Formula						
	--Square						
	--Formula						
	--Parallelogram						
	--Unit count						
	--Formula						
	--Triangle						
	--Formula						
	Volume						
	--Rectangular cube						
	--Unit count						
	--Formula						
	--Cube						
	--Formula						
	Angle						
	Force and pressure						

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
VIII. MEASUREMENT						
1. Identify and interrelate units of measurement.						
Length						
--Metric system						
--Millimeter						
--Centimeter						
--Decimeter						
--Meter						
--Kilometer						
--English system						
--Inch						
--Foot						
--Yard						
--Mile						
Area						
--Square centimeter						
--Square inch						
--Square foot						
--Square yard						
Volume						
--Cubic centimeter						
--Cubic inch						
Angle						
--Degree						
--Unit angle						
Time						
--Decade					267(10)	
--Century					271(10)	
Temperature						
--Degree						

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
IX. FUNCTIONS						
1. Recognize function rules involving mathematical operations.						
Addition						
Subtraction						
Multiplication						
Division						
2. Draw graphs on number planes.						
For number pairs						
For function rules		214(3)				
X. PROBLEM SOLVING						
1. Write headlines for stories (vice versa)				255(8)		
2. Solve problems using mathematical operations.						
Addition and subtraction						
--Whole numbers	185(6)					
--Fractions		220(8)	242(8)			
--Decimals					274-5(6)	
Multiplication and division	193(10)					
Fractions		200,207,212 (10)	232,235(6)			293(3)/DT(2)

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
3. Solve problems related to						
Motion				250-2(10)		
Rates				250-2(10)/DT(4)		
Ratios				246-8(10)		
XI. PROBABILITY AND STATISTICS						
1. Draw and/or interpret graphs.						
Sum graphs						
Line graphs		214(4)				
Pictograms	181(6)			258(10)/DT(4)		
Factor graphs						
3. Predict the probability of events.				256-7,260(10)		
XII. NUMBER THEORY						
1. Recognize special sets of numbers.						
Even and odd numbers	189,195(10)					
Square numbers	189(10)					
Prime numbers	178-9(10) /DT(10)					
Factors of a number	176(10)/34(10) /DT(6)					
--Common factors	184(10)/DT(4)					
--Greatest common factor	184(2)					
--Factor trees	180(10)					
--Factor graphs	181(6)					
Multiples of a number	186-7(10)/35 (10)/DT(4)					
--Common multiples	187(10)/DT(4)					
Exponents	188(10)/DT(10)					
Number pairs						
Number sequences				249(10)		
Ratios				246-8(10)/53 (10)/DT(10)		

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CHAPTER PAGES	8 176-195	9 196-223	10 224-245	11 246-261	12 262-283	13 284-294
2. Reduce numerical expressions to lower and lowest terms.		206(10)/DT(10)				
CHAPTER REVIEWS	194(10)	222(10)	244(10)	259	282	294

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LEVEL 6: CHAPTERS 1-6

CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
I. STRUCTURE						
1. Recognize the laws of mathematical operations.						
The order law (commutativity)						
--For addition			59(1)			
--For multiplication			59(3)			
The grouping law (associativity)						
--For addition			59(1)			
--For multiplication			59,66-7(3) /15(4)			
The distributive law of multiplication over addition			68,72(0) /16(4)			
The adding 0 law (additive identity)			59(1)			
The multiplying by 1 law (multiplicative identity)			59(2)			
The multiplying by 0 law			59(1)			
Properties of 1 in multiplication and division of fractions						
Reciprocals						
Opposites						
Zero as a quotient						
Order of operations						
2. Complete operation boxes.						
Addition boxes		49(6)			132(3)	
Multiplication boxes			69(3)			
II. SETS						
1. Recognize sets from description or roster.						
Symbols						
--Brace notation		34-5(10) /DT(3)				

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CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
-- $\subset$ -- $\cap$ -- $\cup$ Members of a set Subsets		34(1)/DT(3) 36(0)/DT(1) 35(1)/DT(1) 34-5(10) /DT(3) 34(7)/DT(3)				
2. Identify special sets. Empty sets Finite and infinite sets[t]		34,36(1)				
3. Recognize set operations. Union ($\cup$) Intersection ($\cap$) Pairing members of sets		35(10)/DT(1) 36(6)/DT(2) 37(6)				
4. Relate sets, regions or blocks to numbers. Whole numbers Fractions in common form Fractions in decimal form	1(4) 2-9(10)/1-4(10)/DT(4)				116,123(10)/24-5(10)	
5. Relate sets and regions to operations. Addition-subtraction Multiplication-division		48,50(6)/5,10-11(10) 6-7(10)	58-9(10)/12-19(10)			
III. NUMBER AND NUMERATION 1. Read and write numerals. For whole numbers --To thousands --To millions --To billions --To trillions	1,16-7(4) 16-7(8) 16-7(5)/DT(1) 16-7(2)/DT(3)					

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CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
For decimal fractions						
--To tenths	2-6(10)/1(8)/DT(6)					
--To hundredths	7-12(10)/3(8)/DT(10)					
--To thousandths	13(10)/DT(5)					
2. State the place value of a digit.						
In a whole number	1,17(10)					
In a decimal fraction	7,13(10)/1,3(10)					
3. Represent numbers in different forms.						
Table form	3,7(10)/1,3(10)					
Standard form	1-3,13,16-7(10)/DT(10)					
Exponential form						
Rounding numbers.						
Whole numbers						
Decimal fractions						
5. Recognize concepts related to a set of number pairs.						
Function rule		32-3(10)/DT(2)				
Completion of the set		32-3(7)/DT(4)				
Graphing the set on a number plane		33(4)				
6. Recognize fractional numbers.						
Fractional numbers in common form					116-7(10)/24-5(10)	
Equivalent fractions in common form					121,123-7(10)/27(8)/DT(3)	
Mixed numerals in common form					134(10)/DT(3)	
Fractions in percent form						

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CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
Fractional numbers in decimal form	3-13(10)					
--Decimal point	3-13(10)					
--Terminating and nonterminating			88(10)			
7. Count using nonstandard bases.						
Base 6	22-23(7)					
Base 5	23(7)					
Base 2	23(7)					
8. Convert a numeral to another form (vice versa).						
Fractions in common form to fractions in decimal form	10(10)					
Fractions in common form to fractions in percent form						
Fractions in common form to fractions in mixed form					135-6(10)/32-3 (10)/DT(7)	
Decimals to percent						
Base 10 numerals to fractions in other bases						
--Base 6	20-1(10)					
--Base 2	23(7)					
--Base 5	23(7)					
Whole numbers in exponential form to standard form						
9. Identify positive and negative integers.						
10. Use the number line to represent numbers and operations.						
--Fractional numbers					127,134(10) /DT(3)	

CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
--Integers --Multiples Operations --Addition-subtraction --Multiplication-division			58(2)		130(6)	
IV. NUMBER SENTENCES 1. Identify relational symbols <,>,=,≠,≈.	14(10)/2,4(10)/DT(8)					
2. Translate verbal sentences to number sentences and expressions.		30,42-3(10)				
3. Recognize open, false and true sentences.						
4. Solve number sentences involving Whole numbers Fractional numbers Proportions Two-step equations Inequalities	14(10)/2,4(10)/DT(8)	30(10) 48-51(10)/10-1(10)/DT(6)	59(10)		117-20,130-1(10)/29-31(8)/DT(10) 128-9(10)/DT(6)	
5. Solve mathematical expressions.						
6. Use parentheses to show grouping.			59(10)			
7. Identify the order of operation in solving equations.	(See I-1)					
8. Identify related operations in verbal sentences. Addition-subtraction Multiplication-division		28-30(10)/DT(2) 28-30(10)/DT(2)				

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CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
V. ADDITION AND SUBTRACTION						
1. Recall basic facts.	/5(9)					
2. Add-subtract with whole numbers.	1(0)					
3. Add-subtract with fractional numbers.						
Fractional numbers less than 1						
--Like denominators					130(10)/28-9 (10)/DT(2)	
--Unlike denominators					131(10)/30-1 (10)/DT(4)	
--Shortcut form					132(10)	
Fractional numbers more than 1					140(10)/34-5 (10)/DT(4)	
--With regrouping					141-2(10)/36-7 (10)/DT(4)	
4. Add-subtract with decimal fractions.						
Standard form		48,50(10)				
--With regrouping		51-2(10)/10-11 (10)/DT(4)				
Equation form		49(10)/DT(2)				
Shortcut form		49(6)				
5. Add-subtract with integers.						
6. Add-subtract with numerals in different bases.						
Base 5	23(0)					
Base 6	22(10)					
Base 2	23(0)					
7. Estimate sums and differences.						

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CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
VI. MULTIPLICATION AND DIVISION						
1. Recall basic facts.		31(10)/6-7(10)				
2. Multiply-divide with whole numbers.						
Multiplication with 2, 3-digit and 1-digit factors						
--Standard form						
--Without regrouping			60(10)/12(6)			
--With regrouping			61(10)/13(6) /DT(1)			
Multiplication with 2, 3-digit and 10 or 100 as factors						
--Equation form			63(10)			
--Standard form			63(5)/15(4)			
Multiplication with 2, 3-digit and multiples of 10 as factors			66-7(10)/16(4) /DT(2)			
--Using the grouping law			66-7(0)/15(4)			
--Using the distributive law			68(0)/16(4)			
Multiplication with 2, 3-digit factors						
--Standard form			68-9(10)/DT(2)			
Division with 3, 4-digit dividends and 1-digit divisors						
--Standard form						
--Without regrouping			75(10)/17(6) /DT(1)			
--With regrouping			77(10)/18(4) /DT(1)			
Division with 3, 4-digit dividends and 2-digit divisors						
--Standard form			78,81(10)/DT(3)			

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CHAPTER / PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
Division with 4, 5-digit dividends and 3-digit divisors --Standard form			81(6)			
3. Multiply-divide with fractions in common form						
Multiplication with fractions less than 1						
--One factor a whole number						
--One factor a percent						
--Both factors fractions						
Multiplication with fractions greater than 1						
--One factor a whole number						
--Both factors mixed numerals						
Division with fractions less than 1						
--Dividends whole numbers						
--Dividends and divisor fractions						
Division with fractions greater than 1						
--Dividends and divisors whole numbers						
4. Multiply-divide with decimal fractions.						
Multiplication						
--One factor 1-digit whole number			62(10)/14(6) /DT(2)			
--One factor 10 or 100			64(10)/DT(3)			
--One factor a multiple of 10			67(10)/DT(2)			
--One factor 2-digit whole number			72(10)/DT(2)			
--One factor .1 or .01						

CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 145-167
--Shortcut form						
--Both factors decimals						
--Shortcut form						
Division						
--Dividends and divisors whole numbers			83,88(10)			
--Divisors whole numbers			84-5,89(10) /19(6)/DT(5)			
--Divisors .1 or .01						
--Dividends and divisors decimals						
--Shortcut form						
5. Multiply-divide with numerals in different bases.						
Base 6	22-3(0)					
Base 5	22-3(0)					
Base 2	22-3(0)					
6. Estimate products and quotients.						
VII. GEOMETRY						
1. Identify basic figures.						
Points						/DT(1)
--End point						146(2)
--Midpoint						151(1)
Lines						
--Perpendicular						148(5) /DT(1)
--Parallel						148(5) /DT(1)
--Perpendicular bisector						151,159(4) /DT(1)
Segments						146(2) /DT(2)
Rays						146(2) /DT(2)

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	CHAPTER	1	2	3	4	5	6
	PAGES	1-27	28-57	58-93	94-115	116-145	146-167
	Angles						147(10)
							/DT(2)
	--Sides						147(2)
	--Right						147(0)
	--Exterior						167(4)
	--Angle bisector						151(2)
	--Vertex						147(0)
	--Congruent						149(6)
2.	Recognize geometric shapes.						
	Triangles						
	--Equilateral						162-3(4)
							/DT(2)
	--Isosceles						162-3(7)
							/DT(2)
	--Scalene						162-3(2)
							/DT(2)
	Square						
	--Diagonal						
	Rectangle						
	Parallelogram						
	Rhombus						
	Circle						
	--Radius						
	--Diameter						
	--Circumference						
	Trapezoid						
	--Isosceles						
	Polygons						
	--Regular						164(10)
	--Perimeter						
	--Angle						
	--Exterior						167(9)
	Quadrilaterals						

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CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
3. Recognize closed surfaces.						
Cube				107(1)/DT(1)		
--Face				108(10)		
Rectangular solid				107-8(4)/DT(1)		
4. Match geometric figures.						
Congruent figures						149-50(10) /38(6) /DT(1)
--Fittings (complete half-turns)						
--Face-down						153,157(10) /39(6)
--Face-up						153(4)/39 (6)/DT(2)
--Self-congruence						156(6)
--Corresponding parts						154-6(6) /40(5) /DT(1)
Symmetrical figures						
--Points of symmetry						
--Lines of symmetry						158(9)/DT(4)
--Planes of symmetry						
5. Draw a geometric figure to a given scale.						
6. Use a protractor to measure angles.				111(10)/DT(3)		
VIII. MEASUREMENT						
1. Identify and interrelate units of measurement.						
Length						
--Metric system						
--Millimeter				98(7)/22(6) /DT(2)		
--Centimeter				98,100,103(10) /21(6)/DT(4)		
--Decimeter				98(10)/DT(1)		

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CHAPTER	1	2	3	4	5	6
PAGES	1-27	28-57	58-93	94-115	116-145	146-167
--Meter				98,100(10) /DT(4)		
--Decameter				98(0)		
--Hectometer				98(0)		
--Kilometer				98,100,103(2) /DT(1)		
--English system						
--Inch				96,99,100,103 (10)/DT(2)		
--Foot				96,99,103(10) /DT(4)		
--Yard				96,99,100,103 (10)/DT(4)		
--Mile				96,100,103(1) /DT(2)		
Area						
--Metric system						
--Square centimeter				103(6)/DT(1)		
--Square decimeter				103(2)		
--Square meter				103(2)		
--English system						
--Square inch				103(3)/DT(2)		
--Square foot				103(2)/DT(1)		
--Square yard				103(2)		
Volume						
--Metric system						
--Cubic centimeter				107(0)/DT(1)		
--Cubic decimeter				107(1)		
--English system						
--Cubic inch				107(2)/DT(1)		
--Cubic foot				107(3)		
Time						
--Years	25(2)/DT(4)					
--Decade	25(2)/DT(4)					
--Century	25(2)/DT(4)					
Angle						
--Degree				110-1(10) /DT(3)		

	CHAPTER	1	2	3	4	5	6
	PAGES	1-27	28-57	58-93	94-115	116-145	146-167
2.	Perform measurements.						
	Linear						
	--Length				94(3)/21-2(10) /DT(2)		
	--Width				94(3)		
	--Height				94(3)		
	--Circumference						
	--Meaning of Pi						
	--Formula						
	--Estimates				100(0)		
	--Perimeter				101(10)/DT(5)		
	Area						
	--Unit count				102-3,108-9(10) /22(6)		
	--Formula				104(4)/DT(5)		
	Volume						
	--Unit count				106(6)/23(6)		
	--Formula				107(6)/DT(2)		
	Angles				111(10)/DT(3)		
	--Sum of the angles of a triangle				112(1)		
	--Sum of the angles of a quadrilateral				112(1)		
	--Sum of the interior angles of a polygon						
	--Sum of the exterior angles of a polygon						167(6)
IX.	FUNCTIONS						
1.	Recognize function rules involving mathematical operations.						
	Addition-subtraction		28-3(10)/DT(3)				
	Multiplication-division		28-3(10)/DT(3)				
2.	Draw graphs on number planes.						
	For number pairs		33(1)				
	For function rules		33(5)				

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CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
X. PROBLEM SOLVING AND APPLICATIONS						
1. Write verbal problems about a set of given data.		38-9,43(4)				
2. Solve problems using mathematical operations.						
Addition-subtraction						
--Whole numbers		43(2)				
--Fractions					143(2)	
--Decimals			71,74(9)/DT(2)		143(1)	
Multiplication-division						
--Whole numbers		43(2)	63(5)	113(8)		
--Fractions					143(7)/DT(5)	
--Decimals			65,74,87(10) /DT(2)			
3. Solve problems related to						
Rates			74(2)			
Ratio and proportion						
Averages			86(10)/DT(4)			
Motion			71(6)			
Percents		53(9)				
XI. PROBABILITY AND STATISTICS						
1. Predict the probability of events.						
--Certain events						
--Impossible events						
2. Calculate the average of a set of numbers.			86(10)/DT(3)			
3. Draw and/or interpret graphs.						
Line graphs			90(10)			
Bar graphs	19(5)		93(4)			
Circular graphs					138-9(10)	
4. Read and translate data from tables.	18(8)	53(9)				

CHAPTER PAGES	1 1-27	2 28-57	3 58-93	4 94-115	5 116-145	6 146-167
XII. NUMBER THEORY						
1. Recognize special sets of numbers.						
Prime numbers		40(9)				
Factors of a number		40-1(10)/DT(2)				
--Common factor		41(10)/DT(1)				
--Greatest common factor		41(10)/DT(1)				
Multiples of a number		44(10)/8(8) /DT(1)				
--Multiples of .5, 1 and .1						
--Common multiples		45(10)/9(6) /DT(1)				
--Least common multiples		45(10)/DT(2)				
Ratio						
Proportion						
Exponents						
2. Reduce numerical expressions to lower and lowest terms.					125(10)/DT(6)	
CHAPTER REVIEWS	26(10)	55(10)	92(10)	114(10)	144(10)	166(10)

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LEVEL 6: CHAPTERS 7-12

CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
I. STRUCTURE						
1. Recognize the laws of mathematical operations.						
The order law (commutativity)						
--For addition						
--For multiplication						
The grouping law (associativity)						
--For addition						
--For multiplication						
The distributive law of multiplication over addition						
The adding 0 law (additive identity)						
The multiplying by 1 law (multiplicative identity)						
The multiplying by 0 law						
Properties of 1 in multiplication and division of fractions	172(10)					
Reciprocals	184(10)/DT(4)					
Opposites						291-3(10) /DT(3)
Zero as a quotient						
Order of operations		194(10)				
2. Complete operation boxes.						
Addition boxes						293(3)
Multiplication boxes						
II. SETS						
1. Recognize sets from description or roster.						
Symbols						
--Brace notation						

CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
-- ⊂ -- ∩ -- U Members of a set Subsets						
2. Identify special sets. Empty sets Finite and infinite sets[t]						
3. Recognize set operations. Union (U) Intersection ( ) Pairing members of sets						
4. Relate sets, regions or blocks to numbers. Whole numbers Fractions in common form Fractions in decimal form						
5. Relate sets and regions to operations. Addition-subtraction Multiplication-division	168-71(10) /41-5(10) /DT(3)					
III. NUMBER AND NUMERATION 1. Read and write numerals. For whole numbers --To thousands --To millions --To billions --To trillions						

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
For decimal fractions --To tenths --To hundredths --To thousandths						
2. State the place value of a digit. In a whole number In a decimal fraction						
3. Represent numbers in different forms. Table form Standard form Exponential form		197(10)/DT(7)				
4. Rounding numbers. Whole numbers Decimal fractions		211-2(10)/DT(8) 206-7,211-2(10)/DT(8)				
5. Recognize concepts related to a set of number pairs. Function rule Completion of the set Graphing the set on a number plane						
6. Recognize fractional numbers. Fractional numbers in common form Equivalent fractions in common form Mixed numerals in common form Fractions in percent form					271(8);57(10)/DT(6)	

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
Fractional numbers in decimal form --Decimal point --Terminating and nonterminating	188(10)/DT(2)					
7. Count using nonstandard bases. Base 6 Base 5 Base 2						
8. Convert a numeral to another form (vice versa). Fractions in common form to fractions in decimal form	188(10)/DT(8)					
Fractions in common form to fractions in percent form					271-2(10) /57(10)/DT(6)	
Fractions in common form to fractions in mixed form	187(10)/DT(4)					
Decimals to percent					271(10)/56,58 (10)/DT(6)	
Base 10 numerals to fractions in other bases --Base 6 --Base 2 --Base 5						
Whole numbers in exponential form to standard form		197(10)/DT(7)				
9. Identify positive and negative integers.					287-8(10)/DT(9)	
10. Use the number line to represent numbers and operations. --Fractional numbers						

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
--Integers --Multiples		205-7(10)/46-7 (10)				289(0)
Operations --Addition-subtraction --Multiplication-division						
IV. NUMBER SENTENCES						
1. Identify relational symbols <,>,=,≠,~.						
2. Translate verbal sentences to number sentences and expressions.		198-9(10)				
3. Recognize open, false and true sentences.		192(0)				
4. Solve number sentences involving Whole numbers Fractional numbers	168(10)/41-5 (10)/DT(2)					
Proportions					262-4(10) /DT(8)	
Two-step equations Inequalities		195-6(10)/DT(3)				
5. Solve mathematical expressions.		193(10)/DT(9)				
6. Use parentheses to show grouping.						
7. Identify the order of operation in solving equations.	(See I-1)					
8. Identify related operations in verbal sentences. Addition-subtraction Multiplication-division						

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
V. ADDITION AND SUBTRACTION						
1. Recall basic facts.						
2. Add-subtract with whole numbers.						
3. Add-subtract with fractional numbers. Fractional numbers less than 1 --Like denominators --Unlike denominators --Shortcut form Fractional numbers more than 1 --With regrouping						
4. Add-subtract with decimal fractions. Standard form --With regrouping Equation form Shortcut form						
5. Add-subtract with integers.						289-93 (10)/DT(10)
6. Add-subtract with numerals in different bases. Base 5 Base 6 Base 2						
7. Estimate sums and differences.		212-3(10) /DT(2)				

LMS MATH

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
VI. MULTIPLICATION AND DIVISION						
1. Recall basic facts.						
2. Multiply-divide with whole numbers.						
Multiplication with 2, 3-digit and 1-digit factors						
--Standard form						
--Without regrouping						
--With regrouping						
Multiplication with 2, 3-digit and 10 or 100 as factors						
--Equation form						
--Standard form						
Multiplication with 2, 3-digit and multiples of 10 as factors						
--Using the grouping law						
--Using the distributive law						
Multiplication with 2, 3-digit factors						
--Standard form						
Division with 3, 4-digit dividends and 1-digit divisors						
--Standard form						
--Without regrouping						
--With regrouping						
Division with 3, 4-digit dividends and 2-digit divisors						
--Standard form						

CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
Division with 4, 5-digit dividends and 3-digit divisors --Standard form						
3. Multiply-divide with fractions in common form						
Multiplication with fractions less than 1						
--One factor a whole number	168,171(10)/DT(2)					
--One factor a percent					273(10)/DT(6)	
--Both factors fractions	168,170(10)/41(7)/DT(7)					
Multiplication with fractions greater than 1						
--One factor a whole number	174(10)/42(6)/DT(1)					
--Both factors mixed numerals	175(10)/DT(2)					
Division with fractions less than 1						
--Dividends whole numbers	178,181(10)/43-4(10)/DT(1)					
--Dividends and divisor fractions	178,180-2,185(10)/DT(4)					
Division with fractions greater than 1						
--Dividends and divisors whole numbers	186-7(10)/45(8)/DT(8)					
4. Multiply-divide with decimal fractions.						
Multiplication						
--One factor 1-digit whole number						
--One factor 10 or 100			222(10)/48(6)/DT(4)			
--One factor a multiple of 10						
--One factor 2-digit whole number						
--One factor .1 or .01			223(10)/49(6)/DT(1)			

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
--Shortcut form --Both factors decimals ---Shortcut form Division --Dividends and divisors whole numbers --Divisors whole numbers --Divisors .1 or .01 --Dividends and divisors decimals --Shortcut form			223(10) 227,229(10) /50(6)/DT(8) 228(10) 234-5(10)/56(6) /DT(1) 236,239(10) /52(6)/DT(10) 237(10)			
5. Multiply-divide with numerals in different bases. Base 6 Base 5 Base 2						
6. Estimate products and quotients.		212,217(10) /DT(1)				
VII. GEOMETRY 1. Identify basic figures. Points --End point --Midpoint Lines --Perpendicular --Parallel --Perpendicular bisector Segments Rays		204(10)/46(9)				

	CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
	Angles						
	--Sides						
	--Right						
	--Exterior						
	--Angle bisector						
	--Vertex						
	--Congruent						
2.	Recognize geometric shapes.						
	Triangles						
	--Equilateral						
	--Isosceles						
	--Scalene						
	Square				255(4)/DT(4)		
	--Diagonal				250,252(3) /DT(3)		
	Rectangle				254(10)/DT(3)		
	Parallelogram				250(10)		
	Rhombus				253(10)/DT(2)		
	Circle						
	--Radius					281-2(8)/DT(1)	
	--Diameter					279-80(4)/59 (4)/DT(1)	
	--Circumference					279-80(8)/59 (4)/DT(2)	
	Trapezoid				250(1)		
	--Isosceles				252(4)		
	Polygons						
	--Regular						
	--Perimeter						
	--Angle				258(6)		
	--Exterior						
	Quadrilaterals				254-5(10)		

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
3. Recognize closed surfaces. Cube --Face Rectangular solid						
4. Match geometric figures. Congruent figures --Fittings (complete half-turns) --Face-down --Face-up --Self-congruence --Corresponding parts Symmetrical figures --Points of symmetry --Lines of symmetry --Planes of symmetry				/54(6) 244-6(10)/53(6) 245(4) 247-50(10) /DT(10) 251-55(10) /DT(5)		
5. Draw a geometric figure to a given scale.			242(10)			
6. Use a protractor to measure angles.						
VIII. MEASUREMENT 1. Identify and interrelate units of measurement. Length --Metric system --Millimeter --Centimeter --Decimeter						

CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
--Meter						
--Decameter						
--Hectometer						
--Kilometer						
--English system						
--Inch						
--Foot						
--Yard						
--Mile						
Area						
--Metric system						
--Square centimeter						
--Square decimeter						
--Square meter						
--English system						
--Square inch						
--Square foot						
--Square yard						
Volume						
--Metric system						
--Cubic centimeter						
--Cubic decimeter						
--English system						
--Cubic inch						
--Cubic foot						
Time						
--Years						
--Decade						
--Century						
Angle						
--Degree						

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	CHAPTER	7	8	9	10	11	12
	PAGES	168-191	192-221	222-243	244-259	260-285	286-294
2.	Perform measurements.						
	Linear						
	--Length						
	--Width						
	--Height						
	--Circumference					279-80(10) /59(4)/DT(2)	
	--Meaning of Pi					280-3(10) /DT(4)	
	--Formula					280(5)/59(4) /DT(2)	
	--Estimates						
	--Perimeter						
	Area						
	--Unit count					281(8)/60(6)	
	--Formula			240(6)		281-2(10)/DT(2)	
	Volume						
	--Unit count						
	--Formula			240(4)			
	Angles						
	--Sum of the angles of a triangle						
	--Sum of the angles of a quadrilateral						
	--Sum of the interior angles of a polygon				258(10)		
	--Sum of the exterior angles of a polygon						
IX.	FUNCTIONS						
1.	Recognize function rules involving mathematical operations.						
	Addition-subtraction						
	Multiplication-division						
2.	Draw graphs on number planes.						
	For number pairs						
	For function rules						

CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
X. PROBLEM SOLVING AND APPLICATIONS						
1. Write verbal problems about a set of given data.		214(8)				
2. Solve problems using mathematical operations.						
Addition-subtraction						
--Whole numbers						
--Fractions						
--Decimals			226,230(7)			
Multiplication-division						
--Whole numbers		200(2)			283(1)	
--Fractions	173,189(10) /DT(2)	200,209(7)	226(3)		283(1)	
--Decimals		209(5)	226(5)		283(1)	
3. Solve problems related to						
Rates					266-7(10)	
Ratio and proportion					262-5,269 (10)	
Averages			230(3)		268,270(10) /DT(2)	
Motion						
Percents					273(2)	
XI. PROBABILITY AND STATISTICS						
1. Predict the probability of events.					274-5(10) /DT(3)	
--Certain events					276-8(10)	
--Impossible events					276-8(10)	
2. Calculate the average of a set of numbers.						
3. Draw and/or interpret graphs.						
Line graphs		201(7)				
Bar graphs	176(10)					
Circular graphs						
4. Read and translate data from tables.			231(10)			

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CHAPTER PAGES	7 168-191	8 192-221	9 222-243	10 244-259	11 260-285	12 286-294
XII. NUMBER THEORY						
1. Recognize special sets of numbers.						
Prime numbers						
Factors of a number						
--Common factor						
--Greatest common factor						
Multiples of a number		203-4,206-7(10)				
--Multiples of .5, 1 and .1		205-7(10)/46-7 (10)				
--Common multiples						
--Least common multiples						
Ratio					260-1(10)/55(6) /DT(3)	
Proportion					262-5,269 (10)/DT(8)	
Exponents		197(10)/DT(7)				
2. Reduce numerical expressions to lower and lowest terms.						
CHAPTER REVIEWS	190(10)	219(10)	241(10)	257(10)	284(10)	

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